TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

April 23, 1996

Mr. Robert E. O'Bryan
Site Remediation Coordinator
Union Carbide Corporation and Plastics - Brownsville
P. O. Box 471
3301-5 Avenue South
Texas City, Texas 77592-0471

Re: Administrative Corrective Measure Implementation (CMI) Report for
Union Carbide Corporation - Brownsville
TNRCC Industrial Solid Waste Registration No. 31108
TNRCC Hazardous Waste Permit No. HW-50318
EPA ID No. TXD008114092
Approval

Dear Mr. O'Bryan:

The Texas Natural Resource Conservation Commission (TNRCC) has reviewed the Brownsville Navigation District's (owner of the property) deed recordation and certification dated February 15, 1996, for the property formerly occupied by Union Carbide Corporation and Plastic (UCC&P) in Brownsville, Texas. The deed recordation and certification of the referenced property fulfills the requirements of Standards 2 and 3 of 30 TAC 335.560 and 335.566 Risk Reduction Rules and is considered an implementation of an administrative corrective measure. Therefore, the TNRCC hereby approves of the deed restrictions as the administrative CMI Report. In addition, the TNRCC has received UCC&P's October 24, 1995 letter with proof of the October 11, 1995 public notice for the corrective measures. Therefore, the TNRCC hereby approves No Further Action and Corrective Action Termination for the main plant.

It is the continuing obligation of persons associated with a site to assure that industrial or hazardous municipal waste is managed in such a way that it does not cause the discharge or imminent threat of discharge of waste or endangerment of the public health and welfare (refer to 30 TAC 335.4). If the approved Corrective Measure Implementation Report does not meet these requirements, the burden remains upon responsible persons to submit an amendment to the report and/or take any of the necessary and legal actions to correct such conditions.

If you have any questions concerning the comments in this letter, please contact Mr. Brad Wilkinson of the Corrective Action Team at (512) 239-2350, Mail Code MC 127.

Sincerely,

Ray S. Risner, Supervisor
Corrective Action Team
Industrial & Hazardous Waste Division

RSR/bw

cc: Bill Gallagher, EPA Region VI - Dallas
Tony Franco, TNRCC Region 15 - Harlingen
Wade Wheatley, I & HW Div., Permits Section
Tennie Larson, I & HW Div., Corrective Action Section
(CA-a375, CA-550, CA-999 Main Plant)

TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION
P.O. Box 13087
Austin, Texas 78711-3087

ADDRESS CORRECTION REQUESTED

EPA Region VI
1445 Ross Avenue
Dallas, TX 75202

6H-PT

Gallagher

RK

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

May 4 , 1995

Mr. Robert E. O'Bryan
Site Remediation Coordinator
Union Carbide Chemicals and Plastics - Brownsville
P. O. Box 471
3301-5 Avenue South
Texas City, Texas 77592-0471

Re: Corrective Measures Implementation Report
for SWMU AR Tank 1301
Union Carbide Chemicals and Plastics - Brownsville
TNRCC ISW Reg No. 31108
Hazardous Waste Permit No. HW-50318
EPA ID No. TXD008114092

Dear Mr. O'Bryan:

The Texas Natural Resource Conservation Commission (TNRCC) has received and reviewed Union Carbide Chemicals and Plastic's (UCC&P's) revised Corrective Measures Implementation (CMI) Report for solid waste management unit (SWMU) AR referred as Tank 1241 submitted March 13, 1995. The TNRCC's evaluation of the CMI Report indicates that the measures implemented characterizes a reasonable assurance of an effective corrective measure. Therefore, the TNRCC hereby approves the CMI Report, no further action at this time and corrective action termination for this unit. However, since UCC&P does not own the land, the staff's approval of the report does not relieve UCC&P of the responsibility of future investigation/remediation if necessary, or if conditions change.

It is the continuing obligation of persons associated with a site to assure that industrial or hazardous municipal waste is managed in such a way that it does not cause the discharge or imminent threat of discharge of waste or endangerment of the public health and welfare (refer to 30 TAC 335.4). If the approved CMI Report does not meet these requirements, the burden remains upon responsible persons to submit an amendment to the report and/or take any of the necessary and legal actions to correct such conditions.

If you have any questions concerning the comments in this letter, please contact Mr. Brad Wilkinson of the Corrective Action Team at (512) 239-2350, Mail Code MC 127.

Sincerely,

Paul S. Lewis

Paul S. Lewis, Manager
Corrective Action Section
Industrial & Hazardous Waste Division

PSL:BW/jo

cc: Bill Gallagher, EPA Region VI - Dallas
Carlos Rubinstein, TNRCC Region 15 - Harlingen
Tennie Larson, I & HW Div., Corrective Action Section
(CA-a375, CA-550 & CA-999 SWMU AR)

TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION
P.O. Box 13087
Austin, Texas 78711-3087

ADDRESS CORRECTION REQUESTED

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SERVICE DESK
MAR 21 1995

EPA Region VI
1445 Ross Avenue
Dallas, Tx. 75202

Bill Gallagher
6H-PT

75202-2812 54

Jan

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

March 16, 1995

Mr. Robert E. O'Bryan
Site Remediation Coordinator
Union Carbide Chemicals and Plastics - Brownsville
P. O. Box 471
3301-5 Avenue South
Texas City, Texas 77592-0471

Re: Closure Completion Report for Tank 1241
Union Carbide Chemicals and Plastics - Brownsville
ISW Reg No. 31108
Hazardous Waste Permit No. HW-50318
EPA I.D. No. TXD008114092

Dear Mr. O'Bryan:

The Texas Natural Resource Conservation Commission (TNRCC) has received and reviewed Union Carbide Chemicals and Plastic's (UCC&P's) revised Closure Completion Report for Tank 1241 submitted June 30, 1994. The TNRCC's evaluation of the report indicates the Closure Report, which the staff considers equivalent to the Corrective Measures Implementation (CMI) characterizes a reasonable assurance of an effective corrective measure. Therefore, the TNRCC hereby approves the Closure/CMI Report, no further action at this time and corrective action termination for this unit. However, since UCC&P does not own the land, the staff's approval of the report does not relieve UCC&P of the responsibility of future investigation/remediation if necessary, or if conditions change.

It is the continuing obligation of persons associated with a site to assure that industrial or hazardous municipal waste is managed in such a way that it does not cause the discharge or imminent threat of discharge of waste or endangerment of the public health and welfare (refer to 30 TAC 335.4). If the approved Closure Report does not meet these requirements, the burden remains upon responsible persons to submit an amendment to the report and/or take any of the necessary and legal actions to correct such conditions.

If you have any questions concerning the comments in this letter, please contact Mr. Brad Wilkinson of the Corrective Action Team at (512) 239-2350, Mail Code MC 127.

Sincerely,

Paul S. Lewis

Paul S. Lewis, Manager
Corrective Action Section
Industrial & Hazardous Waste Division

PSL:BW/jo

cc: Bill Gallagher, EPA Region VI - Dallas
Carlos Rubinstein, TNRCC Region 15 - Harlingen
Tennie Larson, I & HW Div., Corrective Action Section
(CA-a375, CA-550 & CA-999 Tank 1241)

UNION CARBIDE CORPORATION (UCC)
Union Carbide Remediation Group (UCRG)
3301-5 Avenue South (P O Box 471)
Building 88 Room 24
Texas City, Texas 77592-0471

(409) 948-5226
(409) 948-5339 Fax

UNION CARBIDE

MEMORANDUM

14 October 1994

CERTIFIED MAIL RETURN RECEIPT REQUEST No. P319085962

Mr. Paul S. Lewis, Manager (512) 239-2340 (512) 239-2346 Fax
Corrective Action Section
Industrial and Hazardous Waste Division
Texas Natural Resource Conservation Commission (TNRCC)
1700 North Congress
Stephen F Austin Building
P O Box 13087, Capitol Station
Austin, Texas 78711-3087

SUBJECT: SWMU Z "OLD OIL SKIMMER PITS";
REVISED CORRECTIVE MEASURE IMPLEMENTATION REPORT

REF: Letter to R E O'Bryan (UCC) from P S Lewis (TNRCC-Austin, TX) dated 19 SEP 94
[Corrective Measure Implementation Report for SWMU Z]

UCC SOLVENTS AND COATINGS MATERIALS DIVISION
BROWNSVILLE, TX FACILITY (210) 831-4501 (210) 831-5278 Fax
STAR ROUTE BOX 90 (2.5 miles east of Highway 511 on Highway 48)
BROWNSVILLE, TX 78521

TNRCC PERMIT No. HW-50318
TNRCC SOLID WASTE REGISTRATION No. 31108
EPA ID No. TXD008114092

Dear Mr. Lewis:

Per attached referenced letter, enclosed are two sets of the SWMU Z Revised Corrective Measure Implementation (CMI) Report for Risk Reduction Rules (R^3) Standard 2 closure. An additional set is being sent to TNRCC - District 15 office.

UCC has addressed the three issues enumerated in attached referenced letter by providing corrections and additional information within the enclosed subject revised CMI report. A summary of the corrections / additional information is provided below.

1. The groundwater laboratory results from Monitor Well MW-7692-2 displayed a total dissolved solid (TDS) concentration of 0.0024 parts per million (ppm). This result was in error; the original laboratory data reported a result of 24,000 milligrams per liter (i.e., ppm). Corrected analytical sheets have replaced the erroneous sheets as provided in Appendix C.

2. Total petroleum hydrocarbons (TPH) were left in place in the east sidewall excavation since analysis of specific Appendix IX constituents of TPH (i.e., polycyclic aromatic hydrocarbons, volatile aromatic hydrocarbons and phenol) showed all parameters to be below Standard 1 or Standard 2 R^3 Closure Criteria. [For your information, attached is the Standard Operating Procedure for TPH by Gas Chromatography - Mass Spectrometry.] These results are discussed in detail in Section 4.2 of subject enclosed report. Summary Table 4-1 was revised to reflect all constituent analyses. Also, corrected Figures 1-3 and 4-1 have replaced the previously issued erroneous figures.

3. Site specific background concentrations for metals were calculated by constructing a tolerance interval from background samples. Table 1-2 in Section 1-1 reports the results of these calculations.

Based on the data presented in the enclosed subject revised CMI report and the original data presented in the RCRA Facility Investigation Plan dated 30 JUL 93, UCC has demonstrated that SWMU Z met the criteria for R^3 Standard 2 and can be closed with no further action. The facility's land owner, Brownsville Navigation District (BND), will deed record (refer to Appendix E) this area in the Cameron County deed records within 90 days of TNRCC acceptance of this report.

The BND have expressed a need for obtaining TNRCC clearance expeditiously so as to proceed with leasing to potential business(es). Therefore, your timely review of subject document as well as previously submitted documents concerning this site will be greatly appreciated. If you should require any additional information, please feel free to contact me at (409) 948-5226.

Sincerely,

Robert E. O'Bryan*
Brownsville, TX; Torrance, CA; and Sunnyvale, CA Sites Remediation Program Manager

cc:
G M Alsop - 511*
B P Basile - ENSR Houston, TX**
C S Colman - 500**
H W B Estes - ENSR Houston, TX*
T Franco - TNRCC15 Harlingen, TX*
B Gallagher - EPA VI Dallas, TX***
C J Kruse - BND*
T Larson - TNRCC Austin, TX***
D K Ramsden - ENSR Houston, TX*
S I Shah - 511**
M E Tapp - 803**
Location 526 File*

* complete report
** cover letter, executive summary, Sections 1 - 7 only
*** cover letter only

reo28:bv349

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

September 19, 1994

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert E. O'Bryan
Site Remediation Coordinator
Union Carbide Corporation - Brownsville
P. O. Box 471
3301-5 Avenue South
Texas City, Texas 77592-0471

Re: Corrective Measure Implementation Report for SWMU Z
Union Carbide Corporation - Brownsville
ISW Reg No. 31108
Hazardous Waste Permit No. HW-50318
EPA I.D. No. TXD008114092

Dear Mr. O'Bryan:

The Texas Natural Resource Conservation Commission (TNRCC) has received and reviewed Union Carbide Corporation's (UCC's) submittal dated June 10, 1994. The TNRCC's evaluation of the report indicates that a No Further Action (NFA) request for solid waste management unit (SWMU) Z is not warranted at this time. The TNRCC staff provides the following reasons.

1. Ground-water lab results from monitor well MW-7692-2 displayed a total dissolve solid (TDS) concentration of .0024 ppm. for SWMU Z. UCC used a caveat in the Risk Reduction Rules (RRR) which allows facilities to multiply ground-water protection concentrations by one hundred if the ground-water TDS concentration is above 10,000 ppm. Please explain the use of the RRR multiplier when TDS concentration appears to be below the required TDS value.

2. It appears that UCC has failed to define the horizontal extent of total petroleum hydrocarbon (TPH) contamination for the east sidewall of SWMU Z. Since UCC did not establish background concentration for TPH, the TNRCC staff must rely on method detection limit (MDL) for extent determination. Based on MDLs in Table 4-1 for TPH, the staff believes that results from the east sidewall verification samples indicate that UCC's soil excavation program didn't remove all of the TPH. However, in point three (3) of the TNRCC's letter dated August 18, 1994 to UCC, the staff discussed the Corrective Action Team's current practice for TPH. It is suggested that UCC review that point for available options.

3. In the referenced August 18, 1994 letter, the TNRCC briefly discussed site specific background concentration. Please calculate and report all background concentrations for the facility. UCC should produce and submit a background table for all parameters of concern any time UCC requests no further action (NFA) at a unit.

Please submit one original and one copy of a revised CMI Report within 60 days of the receipt of this letter, and submit any future correspondence to Mr. Paul S. Lewis, Manager, Corrective Action Section, Industrial and Hazardous Waste Division, TNRCC, Box 13087, Austin, Texas 78711-3087. Also please send one copy of the report to TNRCC Region 15 in Harlingen, Texas.

If you have any questions concerning the comments in this letter, please contact Mr. Brad Wilkinson of the Corrective Action Team at (512) 239-2350.

Sincerely,

Paul S. Lewis

Paul S. Lewis, Manager
Corrective Action Section
Industrial & Hazardous Waste Division

PSL:BW/jo

cc: Bill Gallagher, EPA Region VI - Dallas
TNRCC Region 15 - Harlingen
Tennie Larson, I & HW Div., Corrective Action Section (CA-533)

1.0 SCOPE AND APPLICABILITY

1.1 This method covers the determination of petroleum hydrocarbons. This method is applicable to nearly all types of samples, regardless of water content, including ground water, aqueous sludges, oily wastes, soils and sediments. The method is based on gas chromatography-mass spectrometry (GC-MS). The applicable practical quantitation limits (PQL) which are routinely determined by this method are listed in Table I.

TABLE I

TOTAL PETROLEUM HYDROCARBONS BY GC-MS

	WATER (µg/L)	SOIL (µg/kg)
TOTAL PETROLEUM HYDROCARBONS - Gasoline	250	250
TOTAL PETROLEUM HYDROCARBONS - Diesel	250	10000

1.2 Other methods which should be consulted for additional information include AnalytiKEM Standard Operating Procedures (SOPs) entitled

- "Determination of Volatile Organic Compounds by Purge-and-Trap Gas Chromatography-Mass Spectrometry".
- "Determination of Semivolatile Organic Compounds by Capillary Column Gas Chromatography-Mass Spectrometry.
- "Organochlorine Pesticide/PCB/BNA Extraction/Solids"
- "Base/Neutral/Acids/Extraction/Liquids"

1.3 This method is based upon the following EPA methods:

- Volatile Organics - Method 8240, *SW-846: EPA Test Methods for Evaluating Waste-Physical/Chemical Methods*, 3rd Edition and promulgated updates, 1986, USEPA.

- Semivolatile Organics - Method 8270, *SW-846: EPA Test Methods for Evaluating Waste-Physical/Chemical Methods*, 3rd Edition and promulgated updates, 1986, USEPA.

1.4 This method is applicable for the measurement of boiling point ranged from gasoline through crude oil (approximately C_{32}). Gasoline range hydrocarbons are quantified through a purge-and-trap gas chromatograph-mass spectrometer while higher boiling hydrocarbons are quantified by GC-MS analysis of a solvent extract of the sample.

1.5 This method is not recommended for measurement of high molecular weight (approximately C_{32}) or extremely polar hydrocarbons.

2.0 SUMMARY OF THE METHOD

2.1 This method involves the determination of hydrocarbons after extraction of the sample and injection of the extract into a GC-MS. Peaks are separated by the gas chromatograph and detected by the mass spectrometer which provides qualitative and quantitative information. An example chromatogram is shown in Figure 1.

2.3 Qualitative identification of the target analytes is performed using the expected chromatographic retention time characteristic of specific aliphatic hydrocarbons and by a mass spectral fragmentation pattern which is indicative of aliphatic hydrocarbons. Quantitative analysis of positively identified analytes is conducted using the internal standard technique.

3.0 HEALTH AND SAFETY

3.1 Personnel can be exposed to hazardous substances when standard solutions are prepared. Dilute solutions of standards are to be used whenever possible. Analysts are responsible for having read the appropriate Material Safety Data Sheets.

3.2 The instrumentation used in these analyses contains many heated areas. Other heated areas include the gas chromatograph inlet, the gas chromatograph column and the detector.

3.3 The instrumentation used in these analyses operates under 240 V and can be a source of electrical shock. All power to the instruments should be disabled when troubleshooting or repairing the instruments.

3.4 All normal laboratory safety procedures are to be followed when performing these analyses.

4.0 INTERFERENCES

4.1 Method interferences may be caused by contaminants in solvents, reagents, glassware and other sample processing hardware. These contaminants may lead to discrete peaks and/or elevated baselines in chromatograms. All these materials must be demonstrated to be free of interferences under the conditions of the analysis by analyzing method blanks.

4.2 Matrix interferences may be caused by contaminants that are coextracted from the sample. The extent of matrix interferences will vary considerably from source to source, depending on the nature and diversity of the site being sampled.

4.3 Contamination can occur whenever high level and low level samples are sequentially analyzed. Whenever an unusually concentrated sample is encountered, it should be followed by an analysis of solvent to check for cross-contamination.

4.4 Anomalous hydrocarbon patterns should be evaluated by examining individual mass spectra.

4.5 The presence of ketones (such as acetone, 2-butanone, 4-methyl-2-pentanone, or 2-hexanone) in the volatile fraction can produce positive interferences. The presence of phthalate esters (such as bis(2-ethylhexyl)phthalate) can produce positive interferences in the semivolatile fraction.

5.0 APPARATUS AND MATERIALS

5.1 Microsyringes - 10 ul, 25 ul and 50 ul, 20-gauge sideport needle and gas tight.

5.2 Volumetric flasks - various sizes (including 10 ml); Class A with ground glass stoppers.

5.3 Microvials - 0.3 ml, 1 ml; open hole cap with Teflon coated septum.

5.4 Helium - ultra-high purity for carrier gas.

5.5 Ferrules - graphite/vespel, 1/4 inch diameter and 0.5 mm.

5.6 Balance - Analytical, capable of accurately weighing 0.0001 g.

5.7 Balance - Top-loader, capable of accurately weighing 0.01g.

5.8 Thermal Desorption System

5.8.1 The thermal desorption system consists of two pieces of equipment: a Tekmar Model 2016 Automatic Concentrator and a Tekmar LSC 2000 Sample Concentrator. Specifications and operating details for the thermal desorption system are described in AnalytiKEM SOP "Determination of Volatile Organic Compounds by Purge-and-Trap Gas Chromatography-Mass Spectrometry".

5.9 Gas Chromatograph/Mass Spectrometer (GC-MS) System

5.9.1 Gas chromatograph - An analytical system which is capable of temperature programming, on-column injection and variable flow rates. A system such as the Varian 3400 is suitable for this analysis. For semivolatile analyses, the gas chromatograph should be equipped with an autosampler which can be controlled by the GC-MS system software. A suitable autosampler is the CDS100.

5.9.2 Column - 6 ft x 4 mm ID glass, packed with 1% SP-1000 on Carbopack B (60/80 mesh); alternatively, 60 m x 0.75 mm ID VOCOL column or other megabore capillary column designed for volatile analyses.

5.9.3 Column - 30 m x 0.32 mm ID fused silica column such as DB-5 (J & W Scientific) or equivalent for semivolatile analyses.

5.9.3 Mass spectrometer - An analytical system which is capable of scanning from 35 to 260 amu every 3 seconds or less, utilizing 70 eV (nominal) electron energy in the electron impact ionization mode. A system such as the Finnigan INCOS 50 is suitable for this analysis.

5.9.4 GC-MS Interface - Gas chromatograph to mass spectrometer interface constructed of all-glass or glass-lined materials are recommended. A glass jet separator such as that manufactured by SGE Corp. is suitable. Glass surfaces may be deactivated by silanizing with dichlorodimethylsilane.

5.9.5 Data System - A computer system interfaced to the mass spectrometer which allows the continuous acquisition and storage on machine readable media of all mass spectra obtained throughout the duration of the chromatographic program is required. The computer must have software

that allows searching any GC-MS data file for ions of specified mass and plotting such ion abundances versus time or scan number. This type of plot is defined as an Extracted Ion Current Profile (EICP). Software must also be available that allows integrating the abundance in any EICP between specified time or scan number limits. The most recent version of the EPA/NIH Mass Spectral Library should also be available.

6.0 REAGENTS

6.1 Methanol - purge and trap grade.

6.2 Methylene chloride - analytical reagent grade

6.3 Water - nanopure or equivalent grade; must be demonstrated to be free of target analytes through the analysis of daily laboratory blanks.

6.4 Stock standard solutions

6.4.1 Purchase gasoline as a commercial material or as supplied as a standard from manufacturers such as Supelco or Restek. Weigh approximately 20 mg of gasoline in a 10 ml volumetric and dilute to volume with methanol. Store all standard solutions in Teflon®-sealed screw cap vials, with no headspace, -15 to -10°C.

6.4.2 Purchase diesel as a commercial material or as supplied as a standard from manufacturers such as Supelco or Restek. Weigh approximately 500 mg of diesel in a 50 ml volumetric and dilute to volume with methylene chloride. Store all standard solutions in Teflon®-sealed screw cap bottles at 4°C.

6.5 Internal Standard/Surrogate Spiking Solution - Volatiles

6.4.1 Surrogate standards are added to all samples and calibration standards. The compounds utilized for this purpose by AnalytiKEM are 1,2-dichloroethane-d_4, benzene-d_6, toluene-d_8, and 4-bromofluorobenzene.

6.4.2 Internal standards are added to all samples and calibration standards. The compounds utilized for this purpose by AnalytiKEM are bromochloromethane, 1,4-difluorobenzene, and chlorobenzene-d_5.

6.4.3 Prepare a mixture of surrogate and internal standards at a concentration of 50 ug/ml in methanol.

6.6 Internal Standard/Surrogate Standard Spiking Solutions - Semivolatiles

6.6.1 Surrogate standards are added to all samples and calibration standards at the time extraction is initiated. Surrogate standards utilized for this purpose by AnalytiKEM are phenol-d_6, 2-fluorophenol, 2,4,6-tribromophenol, nitrobenzene-d_5, 2-fluorobiphenyl and terphenyl-d_{14}.

6.6.2 Prepare a mixture of acid surrogate standards at 200 µg/ml and base/neutral surrogate standards at 100 µg/ml.

6.6.3 Internal standards are added to all samples and calibration standards prior to analysis. Internal standards utilized by AnalytiKEM are 1,4-dichlorobenzene-d_4, naphthalene-d_8, acenaphthene-d_{10}, phenanthrene-d_{10}, chrysene-d_{12}, and perylene-d_{12}.

6.6.4 Prepare a mixture of internal standards at a concentration of 4000 µg/ml so that adding 10 µl to a 1 ml extract results in a final concentration of 40 µg/ml.

6.7 GC-MS Calibration Standard Solution - Volatiles

6.7.1 Prepare five GC-MS calibration standards containing gasoline at concentrations of 250 µg/L, 500 µg/L, 1000 µg/L, 2500 µg/L, and 5000 µg/L. These will be prepared in water and should only be store for one hour.

6.8 GC-MS Calibration Standard Solutions - Semivolatiles

6.8.1 Prepare five GC-MS calibration standards containing diesel at concentrations of 250 µg/ml, 500µg/ml, 1000 µg/ml, 2500 µg/ml and 5000 µg/ml in methylene chloride. Store at 4°C in Teflon®-sealed bottles. Discard after 6 months or when quality control samples indicate degradation.

6.9 Matrix spiking solution.

6.9.1 Matrix spike standards are added to one per twenty samples per matrix. Matrix spike standards can serve as duplicates by spiking a second aliquot of the sample chosen for spiking. The compounds utilized for this purpose by AnalytiKEM are gasoline for volatile analyses and diesel for semivolatile analyses.

6.10 Prepare other standard solutions for calibration, matrix spikes, surrogate and internal standards and tuning as specified in AnalytiKEM SOPs "Determination of Volatile Organic Compounds by Purge-and-Trap Gas Chromatography-Mass Spectrometry" and "Determination of Semivolatile Organic Compounds by Capillary Column Gas Chromatography-Mass Spectrometry.

7.0 GC-MS CALIBRATION

7.1 Internal Standard Calibration

7.1.1 Prepare calibration standards at concentrations specified in section 6.

7.1.2 Calibration procedures and sample analysis require the instrumental and chromatographic parameters described in AnalytiKEM SOPs "Determination of Volatile Organic Compounds by Purge-and-Trap Gas Chromatography-Mass Spectrometry" and "Determination of Semivolatile Organic Compounds by Capillary Column Gas Chromatography-Mass Spectrometry.

7.1.3 Analyze each calibration standard. Gasoline standards are introduced into the gas chromatograph through the purge and trap system. Purge and trap, gas chromatographic and mass spectrometric conditions are described in the SOP for Volatile Analyses. Diesel standards are introduced into the gas chromatograph through the autosampler. Autosampler, gas chromatographic and mass spectrometric conditions are described in the SOP for Semivolatile Analyses.

7.1.4 Volatiles - Obtain a mass chromatogram for m/z 43. The area for gasoline is integrated from pentane to the end of the chromatographic run. 1,4-Difluorobenzene is used as the internal standard for TPH.

7.1.5 Semivolatiles - Obtain a mass chromatogram for m/z 57. The area is integrated over the diesel range in the lowest concentration standard. Acenaphthene-d_{10} is used as the internal standard for TPH.

7.1.6 Calculate response factors (RF) using the equation 1:

$$Response\ Factor\ (RF) = \frac{A_t * IS}{I_x * A} \qquad (1)$$

where:
A_t = Area of the peaks for gasoline or diesel
A = Concentration of gasoline or diesel to be measured
IS = Concentration of internal standard
I_x = Area of internal standard

7.1.4 The average response factor (RF) must be calculated for all the peaks representative of the gasoline or diesel. Calculate the % Relative Standard Deviation (%RSD) of RF values using equation 2.

$$\%RSD = \frac{SD}{\bar{X}} \qquad (2)$$

where:
SD = Standard deviation
X = average of five response factors.

The %RSD must be less than 25%.

8.0 DAILY GC-MS PERFORMANCE TESTS

8.1 Daily GC-MS performance tests for tuning are described in AnalytiKEM SOPs "Determination of Volatile Organic Compounds by Purge-and-Trap Gas Chromatography-Mass Spectrometry" and "Determination of Semivolatile Organic Compounds by Capillary Column Gas Chromatography-Mass Spectrometry.

8.2 At the beginning of each 12 hour shift that analyses are to be performed, a GC calibration check must be performed to demonstrate the validity of the original calibration curve values.

8.2.1 Volatiles - Analyze a calibration check sample containing gasoline at a level of 1000 µg/L. Instrumental and chromatographic conditions are described the volatiles SOP. The response factor is calculated as described in section 7.1.6.

8.2.2 Semivolatiles - Analyze a calibration check sample containing diesel at a concentration of 500 µg/ml. Instrumental and chromatographic conditions are described the semivolatiles SOP. The response factor is calculated as described in section 7.1.6.

8.2.3 The percent difference (%D) for the response factor for the compounds must be less than 30% for the initial calibration to be valid. The percent difference calculation is shown in equation 3.

$$\%D = \frac{RF_d - \overline{RF}}{\overline{RF}} * 100 \qquad (3)$$

where:
RF_d = Daily response factor
$\overline{RF}$ = Average response factor from initial calibration.

9.0 EXTRACTION PROCEDURES

9.1 Volatiles - Soil and Water

9.1.1 Follow procedure described in AnalytiKEM SOP "Determination of Volatile Organic Compounds by Purge-and-Trap Gas Chromatography-Mass Spectrometry".

9.2 Semivolatiles - Soil and Water

9.2.2 For soil samples follow procedure for BNAs described in AnalytiKEM SOP "Organochlorine Pesticide/PCB/BNA Extraction/Solids"

9.2.2 For water samples follow procedure for BNAs in AnalytiKEM SOP "Base/Neutral/Acids/Extraction/Liquids"

10.0 GAS CHROMATOGRAPHY-MASS SPECTROMETRY ANALYSES

10.1 Analytical conditions for standards and sample extracts are described in AnalytiKEM SOPs entitled "Determination of Volatile Organic Compounds by Purge-and-Trap Gas Chromatography-Mass Spectrometry" and "Determination of Semivolatile Organic Compounds by Capillary Column Gas Chromatography-Mass Spectrometry.

10.2 Inject all standards and samples using the same conditions. Integrate the areas for volatile samples from the retention time of pentane to the end of the chromatographic run. Integrate the areas for semivolatile standards from the beginning of the diesel range hydrocarbons to the end of the chromatographic run.Record the resulting peak areas for calculations of response factors or concentrations.

10.3 If the total peak area exceeds the linear range of the system, dilute the extract and reanalyze.

11.0 CALCULATIONS

11.1 Qualitative Analysis

11.1.1 Gasoline and diesel shall be identified by comparison of sample component retention times and the standard component retention times.

11.1.2 Positive identifications are made by comparison of the peak patterns in the standards with the patterns in the samples and reference mass spectra.

11.2 Quantitative Analysis

11.2.1 Gasoline or diesel is quantified by the internal standard method.

11.2.2 For aqueous samples, the response factor (rf) from the working calibration curve analysis is used to calculate the concentration, in µg/l of total petroleum hydrocarbons in the sample.

$$Conc\ (ug/L) = \frac{A_x * IS * V_t}{I_x * V_l * RF} \quad (4)$$

where:
A_t, RF, I_x and IS are defined in section 8,
V_t = Final volume of extract, including dilutions and
V_l = Volume of water extracted (l).

11.2.3 For sediment/soil, sludge or waste samples, the response factor (RF) from the working calibration curve analysis is used to calculate the concentration, in µg/Kg of total petroleum hydrocarbons in the sample.

$$Conc\ (ug/L) = \frac{A_x * IS * V_t}{I_x * V_l * RF} \quad (5)$$

where:
A_t, RF, I_x and IS are defined in section 8,
V_t = Final volume of extract, including dilutions,
W_s = Weight of sample extracted(g) and
D = % dry weight of the sample.

11.2.4 Sediment/soil samples are generally reported on a dry weight basis, while sludges and wastes are reported on a wet weight basis. Report the % moisture of the sample along with the data.

11.2.5 Report results without correction for recovery data. When duplicates and spiked samples are analyzed, report all data obtained with the sample results.

12. QUALITY CONTROL/QUALITY ASSURANCE

12.1 GC-MS Initial Calibration

12.1.1 Prior to the analysis of samples and blanks, the GC-MS system must be initially calibrated at five levels to determine the linearity of the response for total petroleum hydrocarbons. Once the system has been calibrated, the initial calibration must be verified every 12 hours that sample analyses are performed.

12.1.2 Calculate each response factor using equation 1.

12.1.3 Using the average RF from the initial calibration, calculated the percent relative standard deviation (%RSD) for total petroleum hydrocarbons using equation 2.

12.1.4 The %RSD for total petroleum hydrocarbons must be less than or equal to 25 percent. This criteria must be met for the initial calibration to be valid.

12.2 GC-MS Continuing Calibration Check

12.2.1 A calibration check standard containing either gasoline or diesel must be analyzed at the beginning of the 12 hour shift. This check standard is the mid-level standard.

12.2.2 Calculate the %D for either gasoline or diesel response factor from the continuing calibration and the average response factor from the five point initial calibration using equation 3.

12.2.3 If the percent difference for any compound is greater than 30%, a new initial calibration must be generated. These criteria must be met before sample analysis begins.

12.3 Method Blank Analysis

12.3.1 A method blank consisting of reagent water or anhydrous sodium sulfate must be carried through the entire analytical scheme.

12.3.2 At a minimum, one method blank per matrix per day must be extracted and analyzed.

12.3.3 An acceptable method blank should contain no detectable amounts of total petroleum hydrocarbons.

12.3.4 If a laboratory method blank exceeds these levels, the analyst must consider the analytical system to be out of control. The source of the contamination must be investigated and appropriate corrective measures must be taken and documented before sample analysis can proceed.

12.4 Matrix Spike/Matrix Spike Duplicate Analysis

12.4.1 On a regular basis, a matrix spike and a matrix spike duplicate must be analyzed for each batch (maximum 20 samples/batch) of samples with the same matrix. A minimum of one matrix spike and matrix spike duplicate per matrix must be analyzed every month.

12.4.2 Samples are matrix spiked with gasoline or diesel matrix spike standard for a final concentration of 2.5 mg/L or 250 mg/kg.

13.0 METHOD PERFORMANCE

13.1 The method detection limit (MDL) is defined as the minimum concentration that can be measured and reported with 99% confidence that the value is above zero.

15.2 This method was validated by AnalytiKEM Laboratories using reagent water spiked at 5.0 mg/L. Quadruplicate measurements were obtained and precision and recovery were calculated and are available at the laboratory.

TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION
P.O. Box 13087
Austin, Texas 78711-3087

ADDRESS CORRECTION REQUESTED

AUSTIN
SEP 20 94
TEX

U.S POSTAGE
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9203051

Bill Gallagher
Environmental Protection Agency
Region VI
1445 Ross Avenue
Dallas, TX 75206

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

September 19, 1994

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert E. O'Bryan
Site Remediation Coordinator
Union Carbide Corporation - Brownsville
P. O. Box 471
3301-5 Avenue South
Texas City, Texas 77592-0471

Re: Corrective Measure Implementation Report for SWMU Z
Union Carbide Corporation - Brownsville
ISW Reg No. 31108
Hazardous Waste Permit No. HW-50318
EPA I.D. No. TXD008114092

Dear Mr. O'Bryan:

The Texas Natural Resource Conservation Commission (TNRCC) has received and reviewed Union Carbide Corporation's (UCC's) submittal dated June 10, 1994. The TNRCC's evaluation of the report indicates that a No Further Action (NFA) request for solid waste management unit (SWMU) Z is not warranted at this time. The TNRCC staff provides the following reasons.

1. Ground-water lab results from monitor well MW-7692-2 displayed a total dissolve solid (TDS) concentration of .0024 ppm. for SWMU Z. UCC used a caveat in the Risk Reduction Rules (RRR) which allows facilities to multiply ground-water protection concentrations by one hundred if the ground-water TDS concentration is above 10,000 ppm. Please explain the use of the RRR multiplier when TDS concentration appears to be below the required TDS value.

2. It appears that UCC has failed to define the horizontal extent of total petroleum hydrocarbon (TPH) contamination for the east sidewall of SWMU Z. Since UCC did not establish background concentration for TPH, the TNRCC staff must rely on method detection limit (MDL) for extent determination. Based on MDLs in Table 4-1 for TPH, the staff believes that results from the east sidewall verification samples indicate that UCC's soil excavation program didn't remove all of the TPH. However, in point three (3) of the TNRCC's letter dated August 18, 1994 to UCC, the staff discussed the Corrective Action Team's current practice for TPH. It is suggested that UCC review that point for available options.

3. In the referenced August 18, 1994 letter, the TNRCC briefly discussed site specific background concentration. Please calculate and report all background concentrations for the facility. UCC should produce and submit a background table for all parameters of concern any time UCC requests no further action (NFA) at a unit.

Please submit one original and one copy of a revised CMI Report within 60 days of the receipt of this letter, and submit any future correspondence to Mr. Paul S. Lewis, Manager, Corrective Action Section, Industrial and Hazardous Waste Division, TNRCC, Box 13087, Austin, Texas 78711-3087. Also please send one copy of the report to TNRCC Region 15 in Harlingen, Texas.

If you have any questions concerning the comments in this letter, please contact Mr. Brad Wilkinson of the Corrective Action Team at (512) 239-2350.

Sincerely,

Paul S. Lewis

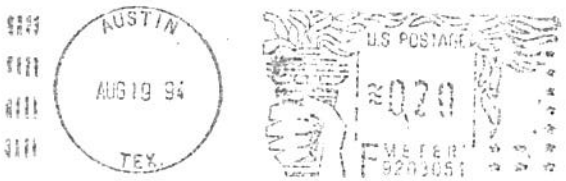
Paul S. Lewis, Manager
Corrective Action Section
Industrial & Hazardous Waste Division

PSL:BW/jo

cc: Bill Gallagher, EPA Region VI - Dallas
TNRCC Region 15 - Harlingen
Tennie Larson, I & HW Div., Corrective Action Section (CA-533)

TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION
P.O. Box 13087
Austin, Texas 78711-3087

ADDRESS CORRECTION REQUESTED



Bill Gallagher
Environmental Protection Agency (EPA)
Region VI
1445 Ross Avenue
Dallas, Texas 75202

75202-2812 54

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

August 18, 1994

Mr. Robert E. O'Bryan
Site Remediation Coordinator
Union Carbide Corporation - Brownsville
P. O. Box 471
3301-5 Avenue South
Texas City, Texas 77592-0471

Re: Corrective Measure Implementation Workplan for SWMU Z
Union Carbide Corporation - Brownsville
ISW Reg No. 31108
Hazardous Waste Permit No. HW-50318
EPA I.D. No. TXD008114092

Dear Mr. O'Bryan:

The Texas Natural Resource Conservation Commission (TNRCC) has received Union Carbide Corporation's (UCC's) Corrective Measures Implementation (CMI) Workplan for SWMU Z dated April 1994. The TNRCC's evaluation indicates that the CMI Workplan, when adequately implemented, should provide reasonable assurance of an effective corrective measure provided the following requirements are addressed.

However, it is the continuing obligation of persons associated with a site to assure that industrial or hazardous municipal waste is managed in such a way that it does not cause the discharge or imminent threat of discharge of waste or endangerment of the public health and welfare (refer to 30 TAC 335.4). If the approved Corrective Measure Implementation Workplan does not meet these requirements, the burden remains upon responsible persons to submit an amendment to the plan and/or take any of the necessary and legal actions to correct such conditions.

1. It is the staff's understanding that UCC used literature data to determine facility background concentrations. The TNRCC may recognize literature data for background concentrations in special cases (i.e. the whole facility is contaminated and natural background cannot be determine on- site). Literature values are commonly published from regional study areas which examine only surface soils. The staff believes that locally metal concentrations vary laterally, with depth, and with lithologic packages. Since the RFI addresses on-site releases

from facility solid waste management unit(s) (SWMU)s, it is therefore necessary to determine facility natural background concentrations. The background borings and RFI Unit soil samples should be collected at equivalent depth(s), lithology(s), and/or saturated zone(s). Please collect the appropriate number of native soil background samples or if available provide results of such sample information in the RFI Report, calculate background concentrations at the site for each constituent and submit the results. Background samples should be collected at the surface and at specific depth intervals depending on the lithologic packages, depth of investigation and saturated zone(s). As such, the background borings should be continuously cored. UCC should use an approvable statistical procedure to determine background.

2. UCC collected soil samples in SWMU Z for release determination. In a November 30, 1993 meeting, UCC discussed the procedure in collecting and analyzing these soil samples. The staff understands that these soil samples are composite soil samples. From the information provided in the meeting, the staff believes the following as the procedure used in collecting soil samples at the Brownsville facility. A grab was collected in the first two foot zone and after the first zone, samples were collected every five feet or elevated PID readings, then composited for analyses at each boring location. The results were then multiplied by the number of composite samples from that boring. The staff questions this procedure due to the volatilization during compositing and the possible masking of contaminated zones. Because of these skewing effects the staff will not accept these sample results as remediation confirmation samples. UCC is proposing to collect confirmation samples after the proposed remediation and analyze these samples for Total Petroleum Hydrocarbon (TPH) only. The TNRCC requires remediation confirmation samples to be grab/discrete soil samples and that chemical analyses be performed for all of the constituents of concern. Please collect the necessary confirmation samples and display the results in table format in the CMI Report.

3. Since TPH includes a variety of organics, health based clean-up levels for TPH are too difficult to establish. TNRCC policy requires that individual organic constituents which constitute TPH be identified and evaluated separtly. Commonly used analytical methods for volatile and semi-volatile organics analyses include many of the organics for which toxicity information exists. Long chain carbon compounds should be identified with "finger printing analysis" or from knowledge of the source to completely identify the components

of the TPH results. At present, action levels for hydrocarbon fractions, which have no toxicity values are typically determined by using leachate results from the contaminated soil on a site specific basis. A site specific TPH concentration from contaminated soils may be approved provided that TCLP or Distilled Water Leaching tests performed on the soil indicate the soil does not leach hydrocarbons. However, if detectable levels of TPH remain in the soil, deed recordation will be required. Detectable levels of TPH in leachate will likely require some manner of post-closure monitoring. Increasing levels of TPH in ground-water monitor wells over time may require remediation. Decreasing levels of TPH in ground water coupled with favorable levels of dissolved oxygen, can be used as an indicator that bioremediation is occurring naturally.

4. UCC stated that verification samples would not be collected if, during the excavation, shallow ground water is encountered. The staff does not agree with this decision and reminds UCC that in any soils investigation stage the first decision is to decide if there has been a release and then to determine extent regardless of whether or not the soil is saturated. In extent determination one of the objectives is to ascertain whether the contamination has reached ground water. Therefore, the staff believes that bottom samples are crucial to the investigation/confirmation. Please submit bottom verification samples in the CMI Report.

5. With respect to SWMU Z, UCC is required to notify the public pursuant to 30 TAC 335.118(b). In addition, corrective measures for Sumps Q107, Q114, and Tank 1241 shall be included in the public notice. Please proceed with the following steps:

    1. Publish the enclosed notice once in its entirety, at your expense, in a newspaper of general circulation which is regularly published or circulated in the county(ies) or the geographical location of the facility;

    2. Mail, immediately upon publication, the following items to the Texas Natural Resource Conservation Commission (TNRCC):

        a. a clipping of the published notice; and,

        b. the original sworn affidavit from the newspaper giving the date on which the notice was published, using the enclosed affidavit form.

The originals and one copy of these items should be sent to Brad Wilkinson, Corrective Action Section, at the letterhead address. Also, one copy of these items should be sent to the TNRCC Region 15 Harlingen Office located at the Matz Building, Room 204, 513 East Jackson, Harlingen, Texas 78550.

The enclosed example notice should be published before the start of your Corrective Measure Implementation. The notice includes the information that the Executive Director believes is necessary to satisfy the requirements of 30 TAC 335.118(b).

Please read the published notice carefully and notify the staff immediately if it contains any errors or omissions concerning the investigation and selection of remedy for the SWMU Z. Should UCC fail to have the notice published according to the above instructions, please notify the Executive Director immediately.

If you have any questions concerning the comments in this letter, please contact Mr. Brad Wilkinson of the Corrective Action Team at (512) 239-2350.

Sincerely,

Paul S. Lewis

Paul S. Lewis, Manager
Corrective Action Section
Industrial & Hazardous Waste Division

PSL:BW/jo

cc: Bill Gallagher, EPA Region VI - Dallas
TNRCC Region 15 - Harlingen
Richard Clarke, I & HW Div., Closure Team
Tennie Larson, I & HW Div., Corrective Action Section (CA - 500)

SEP 24 1993

Mr. Robert O'Bryan
Senior Staff Environmental Engineer
Union Carbide Chemical and Plastics Company, Inc.
Box 471, 3301 5th Avenue South
Texas City, Texas 77590

Re: Approval of Equivalency Demonstration; Closure by Removal,
Ball Mill Residue Basin, Union Carbide Chemicals and Plastics,
Brownsville, Texas - EPA I.D. No TXD008114092

Dear Mr. O'Bryan:

On March 31, 1993, the U.S. Environmental Protection Agency (EPA) received a voluntary submittal from Union Carbide for EPA's determination that closure of the Ball Mill Residue Basin at the Brownsville, Texas plant meets the clean closure requirements under 40 CFR Part 264 (equivalency demonstration). The EPA has completed its review of your submittal and has concluded that closure of the subject unit meets the federal requirements for clean closure under 40 CFR Part 264.

Since Union Carbide is currently under a RCRA permit, we suggest that you contact the Texas Natural Resources Conservation Commission (TNRCC, formerly the Texas Water Commission) about modifying the conditions of the permit with regard to the Ball Mill Residue Basin based on our equivalency demonstration determination. The TRNCC would be the agency that would process this permit.

If you have questions or need further information regarding this determination, you may contact Jon G. Rinehart at (214) 655-6789.

Sincerely yours,

Allyn M. Davis, Director
Hazardous Waste Management Division (6H)

cc: Susan Ferguson

JGR 9-23-93
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6H-PT	6H-P	6H-P	6H
KING	THOMAS	HONKER	MORISATO
9/23	9/24	9/24	9/24

BRIEFING SHEET

Union Carbide Chemicals and Plastics Company Inc.
Brownsville, Texas
TXD008114092

Subject: Equivalency Determination: Union Carbide petitioned EPA by letter dated March 31, 1993 , for a determination that closure of its Ball Mill Residue Basin meets the requirements for a removal under 40 CFR Part 264.

Recommendation: Approval of the petition.

Description of Operations: Union Carbide is a former chemical manufacturing plant located approximately 10 miles east of Brownsville, Texas. The plant ceased operation in 1983. Demolition of the plant began in 1988 and was completed in mid 1992.

Waste Management: The facility has a post - closure care permit jointly issued by the Texas Water Commission and EPA in November 1992. The permit was written for the Ball Mill Residue Basin . The certification of the closure of the BMRB was accepted on September 26, 1986. There are thirty (30) SWMUs that are to be investigated under the RFI of the post-closure permit.

The Ball Mill Residue Basin is the RCRA Unit and is the subject of Union Carbide's petition for an equivalency determination. This unit 270 feet long and 170 feet wide. The bottom surface area of the impoundment is 0.86 acres.The operation of this unit was continuous from 1975 until mid 1983. The unit had a natural clay liner. The Ball Mill residues were heavy organic residues , which were characteristically ignitable (D001) due to the presence of light fraction hydrocarbons, corrosivity (D002) due to low pH from organic acid production, and EP-toxicity due to chromium (D007).

Closure Activities: The last shipment of waste was received on July 23, 1983. From 1986 until January 1989, storm water was intermittently decanted from the basin to maintain the sludges in a dewatered state on the bottom of the basin and eliminate an artificial hydraulic head within the basin. In January 1989, closure of the basin was started with the removal of sludge and subsoil. Sampling of the underlying soil is included with equivalency demonstration package. The remaining soil is below action levels per the proposed Subpart S and the Texas Risk Reduction Rule.

Groundwater Issues: The groundwater contamination that was identified around the surface impoundment has lessened since the waste has been removed from the impoundment. There are some contaminants still present in the ground water , but they do not

exceed the action levels referenced in the proposed Subpart S rule and the Texas Risk Reduction Rule. In addition the groundwater has 10,000 total dissolved solids (TDS), which is a Class III aquifer. This means that the groundwater is not drinkable. Texas applies a factor of 100 times the action levels for groundwater referenced for the Texas Risk Reduction Rule.

R6CAPS Score: 1641

Enforcement Status: EPA RCRA Enforcement has no pending enforcement actions at this time.

Continuation of the Permit/Corrective Action: The TWC plans to keep the post-closure permit in effect until all of the SWMUs that were identified in the permit for corrective action under RFI, are completed through the final remedy.

Clean Closure Criteria for Groundwater-Union Carbide-Brownsville

CONSTITUENT	SUBPART S MG/L	TEXAS RRR STANDARD MG/L	CLASSIII MG/L	MAXIMUM CONSTITUENT IDENTIFIED
Antimony	0.01	0.006	1.0	<0.003
Arsenic	0.05*	0.05	5.0	0.012
Barium	1.0*	2.0	100.0	<0.2
Beryllium	0.0005**	0.004	0.4	0.005
Cadmium	0.005*	0.005	0.5	0.0005
Chromium (VI)	0.18	0.1	10.0	0.012
Cyanide	0.7	0.2	70.0	<0.01
Lead	0.015*	0.015	1.5	<0.002
Mercury	0.002*	0.002	0.2	<0.0002
Nickel	0.7	0.1	70.0	<0.03
Selenium(Sel. acid)	0.05*	0.05	5.0	<0.015
Silver	0.05*	0.183	5.0	<0.01
Thallium(Thallic Oxide)	0.002	No value	0.2	<0.001
Vanadium(Vanadium Pentoxide)	0.3	No value	30.0	<0.2
Benzene	0.005*	0.005	0.5	<0.005
p-dimethylaminoazo-benzene	0.01	No value	1.0	<0.1
Carbon disulfide	4	3.65	400	<0.005
Chlorobenzene	0.1*	0.1	10.0	<0.005
Chloroform	0.006	0.1	0.6	<0.005
Chrysene	0.01**	No value	1.0	<0.010
m-creosol	2	1.83	200	<0.010
o-creosol	2	1.83	200	<0.010

p-creosol	2	1.83	200	<0.010
1,2-dichlorobenzene	0.06*	0.6	60.0	<0.001
1,1-dichoroethylene	0.007*	0.007	0.700	0.003
trans-1,2-dichloroethylene	0.001**	0.01	0.10	<0.001
2,4-dimethylphenol	No value	0.73	73.0	0.59
Di-n-octyphthalate	No value	0.73	73.0	<0.100
Fluoranthene	No value	1.46	146.0	<0.100
Isobutyl Alcohol	10.0	11.0	1000.0	?
Methyl Ethyl Ketone	2.0	1.83	200.0	<0.010
Methylene Chloride	0.005	0.005	0.500	<0.005
Naphthalene	0.01**	1.46	1.0	<0.100
Phenol	20.0	21.9	2000.0	<0.100
Pyridine	0.04	0.365	4.0	<0.200
Toluene	1.0	1.0	100.0	<0.005
1,1,1-Trichloroethane	0.2*	0.2	20.0	<0.005
Trichloroethylene	0.005*	0.005	0.500	<0.001
Pentachlorophenol	1.0	0.001	100.0	0.15
Formaldehyde	No value	0.001	100.0	3.9

* denotes an MCL
** denotes a PQL
*** denotes highest concentration found in any monitor well 4-28-92

Clean Closure Criteria for soil Union Carbide-Brownsville

CONSTITUENT	SUBPART S MG/KG	TEXAS RRR MG/KG INDUSTRIAL	MAXIMUM CONSTITUENT IDENTIFIED
Antimony	30	818	<.3
Arsenic	80	3.27	13
Barium	4,000	137,000	260
Beryllium	1.0	1.33	1.4
Cadmium	40	1,020	1
Chromium	400	5,110	50
Lead	500	1,000	110
Mercury	20	613	8.2
Nickel	2,000	20,400	86
Selenium	200	10,200	<.3
Silver	200	10,200	<1
Thallium	6	No Value	0.3
Vanadium	700	No Value	50
Cyanide	2,000	40,900	<.25
Chrysene	PQL		0.3
Di-n-octylphthalate		40,900	0.3
Dimethylaminoabenzene	PQL		0.3
Fluoranthene		81,800	0.3
Pyridine	80	2,040	0.6
m-creosol	4,000	51,100	0.3
0-creosol	4,000	51,100	0.3
p-creosol	4,000	51,100	0.3
1,1-Dichloroethylene		0.872	0.007
1,2-Dichlorobenzene		8,390	0.005

1,2-Dichloroethylene		108	0.005
Trichloroethylene	60	2.85	<.005
2,4-Dimethylphenol		40,900	0.005
Pentachlorophenol	2,000	47.7	8.3
Phenol	50,000	No value	0.330
Formaldehyde		205,000	67.92
Hydrazine	0.20	No value	<0.7
1,1,1-Trichloroethane	7,000	14,000	<.005
Benzene		1.62	<.005
Carbon Disulfide	80	23.4	<.005
Chloroform	100	0.504	<.005
Isobutyl Alcohol	20,000	613,000	1.4
Methyl Ethyl Ketone	4,000	14,000	.036
Toluene	2,000	3,630	<0.005
Methylene Chloride	90	13.8	.008

SEP 2 4 1993

Mr. Minor B. Hibbs, Chief
Permits Section
Industrial & Hazardous Waste Division
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711-3087

Re: Approval of Equivalency Demonstration; Closure by Removal
Ball Mill Residue Basin, Union Carbide Chemicals and Plastics,
Brownsville, Texas- EPA I.D. No. TXD008114092

Dear Mr. Hibbs:

On March 31, 1993, the U.S. Environmental Protection Agency (EPA) received a voluntary submittal from Union Carbide for EPA's determination that closure of the Ball Mill Residue at the Brownsville, Texas plant meets the clean closure requirements under 40 CFR Part 264 (equivalency demonstration). We have completed our review of Union Carbide's submittal and have concluded that closure of the subject unit has met the federal requirements for clean closure under 40 CFR Part 264.

Since this unit is currently under a RCRA permit, we suggested Union Carbide contact you regarding modifying the current post-closure permit conditions on this unit.

Union Carbide - Brownsville was issued a post-closure permit in November 1992, which required the facility to conduct RFI activities at a number of solid waste management units. It is our understanding from discussions with your staff, that TNRCC will not terminate the post-closure permit until all corrective action activities are complete.

If you have any questions, please contact Jon G. Rinehart at (214) 655-6789.

Sincerely yours,

William K. Honker, P.E.
Chief, RCRA Permits Branch (6H-P)

Enclosures

JDR 9-23-93

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6H-PT	6H-P	6H-P
KING	THOMAS	HONKER
9/23		WKH 9/24

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

SEP 24 1993

Mr. Minor B. Hibbs, Chief
Permits Section
Industrial & Hazardous Waste Division
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711-3087

Re: Approval of Equivalency Demonstration; Closure by Removal
Ball Mill Residue Basin, Union Carbide Chemicals and Plastics,
Brownsville, Texas- EPA I.D. No. TXD008114092

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Since this unit is currently under a RCRA permit, we suggested Union Carbide contact you regarding modifying the current post-closure permit conditions on this unit.

Union Carbide - Brownsville was issued a post-closure permit in November 1992, which required the facility to conduct RFI activities at a number of solid waste management units. It is our understanding from discussions with your staff, that TNRCC will not terminate the post-closure permit until all corrective action activities are complete.

If you have any questions, please contact Jon G. Rinehart at (214) 655-6789.

Sincerely yours,

William K. Honker, P.E.
Chief, RCRA Permits Branch (6H-P)

Enclosures

BRIEFING SHEET

Union Carbide Chemicals and Plastics Company Inc.
Brownsville, Texas
TXD008114092

Subject: Equivalency Determination: Union Carbide petitioned EPA by letter dated March 31, 1993 , for a determination that closure of its Ball Mill Residue Basin meets the requirements for a removal under 40 CFR Part 264.

Recommendation: Approval of the petition.

Description of Operations: Union Carbide is a former chemical manufacturing plant located approximately 10 miles east of Brownsville, Texas. The plant ceased operation in 1983. Demolition of the plant began in 1988 and was completed in mid 1992.

Waste Management: The facility has a post - closure care permit jointly issued by the Texas Water Commission and EPA in November 1992. The permit was written for the Ball Mill Residue Basin . The certification of the closure of the BMRB was accepted on September 26, 1986. There are thirty (30) SWMUs that are to be investigated under the RFI of the post-closure permit.

The Ball Mill Residue Basin is the RCRA Unit and is the subject of Union Carbide's petition for an equivalency determination. This unit 270 feet long and 170 feet wide. The bottom surface area of the impoundment is 0.86 acres.The operation of this unit was continuous from 1975 until mid 1983. The unit had a natural clay liner. The Ball Mill residues were heavy organic residues , which were characteristically ignitable (D001) due to the presence of light fraction hydrocarbons, corrosivity (D002) due to low pH from organic acid production, and EP-toxicity due to chromium (D007).

Closure Activities: The last shipment of waste was received on July 23, 1983. From 1986 until January 1989, storm water was intermittently decanted from the basin to maintain the sludges in a dewatered state on the bottom of the basin and eliminate an artificial hydraulic head within the basin. In January 1989, closure of the basin was started with the removal of sludge and subsoil. Sampling of the underlying soil is included with equivalency demonstration package. The remaining soil is below action levels per the proposed Subpart S and the Texas Risk Reduction Rule.

Groundwater Issues: The groundwater contamination that was identified around the surface impoundment has lessened. since the waste has been removed from the impoundment. There are some contaminants still present in the ground water , but they do not

exceed the action levels referenced in the proposed Subpart S rule and the Texas Risk Reduction Rule. In addition the groundwater has 10,000 total dissolved solids (TDS), which is a Class III aquifer. This means that the groundwater is not drinkable. Texas applies a factor of 100 times the action levels for groundwater referenced for the Texas Risk Reduction Rule.

R6CAPS Score: 1641

Enforcement Status: EPA RCRA Enforcement has no pending enforcement actions at this time.

Continuation of the Permit/Corrective Action: The TWC plans to keep the post-closure permit in effect until all of the SWMUs that were identified in the permit for corrective action under RFI, are completed through the final remedy.

Clean Closure Criteria for Groundwater-Union Carbide-Brownsville

CONSTITUENT	SUBPART S MG/L	TEXAS RRR STANDARD MG/L	CLASSIII MG/L	MAXIMUM CONSTITUENT IDENTIFIED
Antimony	0.01	0.006	1.0	<0.003
Arsenic	0.05*	0.05	5.0	0.012
Barium	1.0*	2.0	100.0	<0.2
Beryllium	0.0005**	0.004	0.4	0.005
Cadmium	0.005*	0.005	0.5	0.0005
Chromium (VI)	0.18	0.1	10.0	0.012
Cyanide	0.7	0.2	70.0	<0.01
Lead	0.015*	0.015	1.5	<0.002
Mercury	0.002*	0.002	0.2	<0.0002
Nickel	0.7	0.1	70.0	<0.03
Selenium(Sel. acid)	0.05*	0.05	5.0	<0.015
Silver	0.05*	0.183	5.0	<0.01
Thallium(Thallic Oxide)	0.002	No value	0.2	<0.001
Vanadium(Vanadium Pentoxide)	0.3	No value	30.0	<0.2
Benzene	0.005*	0.005	0.5	<0.005
p-dimethylaminoazo-benzene	0.01	No value	1.0	<0.1
Carbon disulfide	4	3.65	400	<0.005
Chlorobenzene	0.1*	0.1	10.0	<0.005
Chloroform	0.006	0.1	0.6	<0.005
Chrysene	0.01**	No value	1.0	<0.010
m-creosol	2	1.83	200	<0.010
o-creosol	2	1.83	200	<0.010

p-creosol	2	1.83	200	<0.010
1,2-dichlorobenzene	0.06*	0.6	60.0	<0.001
1,1-dichoroethylene	0.007*	0.007	0.700	0.003
trans-1,2-dichloroethylene	0.001**	0.01	0.10	<0.001
2,4-dimethylphenol	No value	0.73	73.0	0.59
Di-n-octyphthalate	No value	0.73	73.0	<0.100
Fluoranthene	No value	1.46	146.0	<0.100
Isobutyl Alcohol	10.0	11.0	1000.0	?
Methyl Ethyl Ketone	2.0	1.83	200.0	<0.010
Methylene Chloride	0.005	0.005	0.500	<0.005
Naphthalene	0.01**	1.46	1.0	<0.100
Phenol	20.0	21.9	2000.0	<0.100
Pyridine	0.04	0.365	4.0	<0.200
Toluene	1.0	1.0	100.0	<0.005
1,1,1-Trichloroethane	0.2*	0.2	20.0	<0.005
Trichloroethylene	0.005*	0.005	0.500	<0.001
Pentachlorophenol	1.0	0.001	100.0	0.15
Formaldehyde	No value	0.001	100.0	3.9

* denotes an MCL
** denotes a PQL
*** denotes highest concentration found in any monitor well 4-28-92

Clean Closure Criteria for soil Union Carbide-Brownsville

CONSTITUENT	SUBPART S MG/KG	TEXAS RRR MG/KG INDUSTRIAL	MAXIMUM CONSTITUENT IDENTIFIED
Antimony	30	818	<.3
Arsenic	80	3.27	13
Barium	4,000	137,000	260
Beryllium	1.0	1.33	1.4
Cadmium	40	1,020	1
Chromium	400	5,110	50
Lead	500	1,000	110
Mercury	20	613	8.2
Nickel	2,000	20,400	86
Selenium	200	10,200	<.3
Silver	200	10,200	<1
Thallium	6	No Value	0.3
Vanadium	700	No Value	50
Cyanide	2,000	40,900	<.25
Chrysene	PQL		0.3
Di-n-octylphthalate		40,900	0.3
Dimethylaminoabenzene	PQL		0.3
Fluoranthene		81,800	0.3
Pyridine	80	2,040	0.6
m-creosol	4,000	51,100	0.3
0-creosol	4,000	51,100	0.3
p-creosol	4,000	51,100	0.3
1,1-Dichloroethylene		0.872	0.007
1,2-Dichlorobenzene		8,390	0.005

1,2-Dichloroethylene		108	0.005
Trichloroethylene	60	2.85	<.005
2,4-Dimethylphenol		40,900	0.005
Pentachlorophenol	2,000	47.7	8.3
Phenol	50,000	No value	0.330
Formaldehyde		205,000	67.92
Hydrazine	0.20	No value	<0.7
1,1,1-Trichloroethane	7,000	14,000	<.005
Benzene		1.62	<.005
Carbon Disulfide	80	23.4	<.005
Chloroform	100	0.504	<.005
Isobutyl Alcohol	20,000	613,000	1.4
Methyl Ethyl Ketone	4,000	14,000	.036
Toluene	2,000	3,630	<0.005
Methylene Chloride	90	13.8	.008

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

SEP 24 1993

Mr. Robert O'Bryan
Senior Staff Environmental Engineer
Union Carbide Chemical and Plastics Company, Inc.
Box 471, 3301 5th Avenue South
Texas City, Texas 77590

Re: Approval of Equivalency Demonstration; Closure by Removal,
Ball Mill Residue Basin, Union Carbide Chemicals and Plastics,
Brownsville, Texas - EPA I.D. No TXD008114092

Dear Mr. O'Bryan:

On March 31, 1993, the U.S. Environmental Protection Agency (EPA) received a voluntary submittal from Union Carbide for EPA's determination that closure of the Ball Mill Residue Basin at the Brownsville, Texas plant meets the clean closure requirements under 40 CFR Part 264 (equivalency demonstration). The EPA has completed its review of your submittal and has concluded that closure of the subject unit meets the federal requirements for clean closure under 40 CFR Part 264.

Since Union Carbide is currently under a RCRA permit, we suggest that you contact the Texas Natural Resources Conservation Commission (TNRCC, formerly the Texas Water Commission) about modifying the conditions of the permit with regard to the Ball Mill Residue Basin based on our equivalency demonstration determination. The TRNCC would be the agency that would process this permit.

If you have questions or need further information regarding this determination, you may contact Jon G. Rinehart at (214) 655-6789.

Sincerely yours,

Jack Divita

for Allyn M. Davis, Director
Hazardous Waste Management Division (6H)

cc: Susan Ferguson
TRNCC

CORRECTIVE ACTION STABILIZATION QUESTIONNAIRE

Completed by: Jon Rinehart
Date: 12-31-92

Background Facility Information

Facility Name: Union Carbide
EPA Identification No.: TXD 008114092
Location (City, State): Brownsville, Texas
Facility Priority Rank: High

1. Is this checklist being completed for one solid waste management unit (SWMU), several SWMUs, or the entire facility? Explain.
29 SWMUs are rec. for the RFI

Status of Corrective Action Activities at the Facility

2. What is the current status of HSWA corrective action activities at the facility?

   ( ) No corrective action activities initiated
   (X) RCRA Facility Assessment (RFA) or equivalent completed
   ( ) RCRA Facility Investigation (RFI) completed
   ( ) Corrective Measures Study (CMS) completed
   ( ) Corrective Measures Implementation (CMI) begun or completed
   ( ) Interim Measures begun or completed

3. If corrective action activities have been initiated, are they being carried out under a permit or an enforcement order?

   ( ) Operating permit
   (X) Post-closure permit
   ( ) Enforcement order

4. Have interim measures, if required or completed [see Question 2], been successful in preventing the further spread of contamination at the facility?

   ( ) Yes
   ( ) No
   (?) Uncertain; still underway

CONTINUE TO QUESTION 5 <u>ONLY</u> IF THE FOLLOWING CONDITIONS ARE MET:

- *The facility ranks "High" on the National Corrective Action Prioritization System; <u>AND</u>*
- *Interim Measures have not been initiated, or if initiated, have not been successful in preventing the further spread of contamination at the facility.*

Facility Releases and Exposure Concerns

5. To what media have contaminant releases from the facility occurred or been suspected of occurring?

   (X) Ground water
   (X) Surface water
   ( ) Air
   (X) Soils

6. Are contaminant releases migrating off-site?

( ) Yes; Indicate media, concentrations, and level of certainty.

( ) No
(X) Uncertain

7a. Are humans currently being exposed to contaminants released from the facility?

( ) Yes
( ) No
(X) Uncertain

7b. Is there a potential for human exposure to the contaminants released from the facility over the next five to 10 years?

( ) Yes
( ) No
(X) Uncertain

8a. Are environmental receptors currently being exposed to contaminants released from the facility?

( ) Yes
( ) No
(X) Uncertain

8b. Is there a potential that environmental receptors could be exposed to the contaminants released from the facility over the next five to 10 years?

(X) Yes
( ) No
( ) Uncertain

Anticipated Final Corrective Measures

9. If already identified or planned, would final corrective measures be able to be implemented in time to adequately address any existing or short-term threat to human health and the environment?

( ) Yes
( ) No
(X) Uncertain

Additional explanatory notes:

10. Could a stabilization initiative at this facility reduce the present or near-term (e.g., less than two years) risks to human health and the environment?

( ) Yes
( ) No
(X) Uncertain

Additional explanatory notes:

11. If a stabilization activity were not begun, would the threat to human health and the environment significantly increase before final corrective measures could be implemented?

( ) Yes
( ) No
(X) Uncertain

Additional explanatory notes:

Technical Ability to Implement Stabilization Activities

12. In what phase does the contaminant exist under ambient site conditions?

    ( ) Solid
    ( ) Light non-aqueous phase liquids (LNAPLs)
    ( ) Dense non-aqueous phase liquids (DNAPLs)
    (X) Dissolved in ground water or surface water
    ( ) Gaseous
    ( ) Other _____

13. Are one or more of the following major chemical groupings of concern at the facility?

    (X) Volatile organic compounds (VOCs) and/or semi-volatiles
    ( ) Polynuclear aromatics (PAHs)
    ( ) Pesticides
    ( ) Polychlorinated biphenyls (PCBs) and/or dioxins
    ( ) Other organics
    (X) Inorganics and metals
    ( ) Explosives
    ( ) Other_____

14. Are appropriate stabilization technologies available to prevent the further spread of contamination, based on contaminant characteristics and the facility's environmental setting? [See Attachment A for a listing of potential stabilization technologies.]

    (X) Yes; Indicate possible course of action.

    Pump and treat ground water

    ( ) No; Indicate why stabilization technologies are not appropriate; then go to Question 19.

15. Has the RFI, or another environmental investigation, provided the site characterization and waste release data needed to design and implement a stabilization activity?

    (X) Yes
    ( ) No

    If No, can these data be obtained faster than the data needed to implement the final corrective measures?

    ( ) Yes
    ( ) No

Timing and Other Procedural Issues Associated with Stabilization

16. Can stabilization activities be implemented more quickly than the final corrective measures?

    ( ) Yes
    ( ) No
    (X) Uncertain

    Additional explanatory notes:

17. Can stabilization activities be incorporated into the final corrective measures at some point in the future?

    ( ) Yes
    ( ) No
    (X) Uncertain

    Additional explanatory notes:

Conclusion

18. Is this facility an appropriate candidate for stabilization activities?

(X) Yes
( ) No, not feasible
( ) No, not required

Explain final decision, using additional sheets if necessary.

possible when further information is received through the RFI

TEXAS WATER COMMISSION
P.O. BOX 13087
CAPITOL STATION
AUSTIN, TEXAS 78711-3087

ADDRESS CORRECTION REQUESTED

AUG 25 '92

Environmental Protection Agency
Attn: Bill Honker 6H-CP
Chief Permit Section
1445 Ross Avenue
Dallas, Texas 75202-2733

TEXAS WATER COMMISSION

AMENDED NOTICE OF APPLICATION FOR HAZARDOUS WASTE FACILITY
POST-CLOSURE CARE PERMIT

UNION CARBIDE CHEMICALS and PLASTICS COMPANY, INC., SOLVENTS and Coatings Materials Division, Star Route Box 90, Brownsville, Texas 78521 has applied to the Texas Water Commission (TWC) for post closure care permit (Proposed Permit No. HW50318, EPA I.D. No. TXD 009114092) to manage post-closure care of a surface impoundment known as the Ball Mill Residue Basin at its Brownsville, Texas facility. The Ball Mill Residue Basin was used to manage Class I hazardous wastes generated during the manufacture of acetic acid, acetic anhydride, ethanol, ethyl acetate, formic acid, methyl ethyl ketone and propionic acid. The Brownsville facility does not currently store, process or dispose of hazardous waste. The proposed post-closure care permit would authorize Union Carbide to conduct post-closure care activities.

The facility is located on Highway 48, 2.5 miles east of the intersection of Highway 48 and FM 511, in Brownsville, Cameron County, Texas. This location is in the drainage area of Segment No. 2301 of the Rio Grande River Basin (north latitude 25°58'19", west longitude 97°22'21").

The Executive Director of the Texas Water Commission has prepared a draft permit which, if approved by the Commission, will authorize post closure care of this facility under the terms described above. A copy of the draft permit is available for inspection in the offices of the Texas Water Commission, 1700 North Congress Avenue, Austin, Texas 78701. The Executive Director has also prepared a summary of the applicant's compliance history at this facility, copies of which are available upon request.

Legal Authority: Section 5.103 of the Texas Water Code, as amended; Texas Health and Safety Code, Chapter 361 (Vernon 1990); 31 TAC Chapters 305 and 335 of the Rules of the Texas Water Commission.

This notice satisfies the requirements of the Resource Conservation and Recovery Act (RCRA), as amended, 42 U.S.C. §6901 et seq. and 40 CFR §124.10. The draft permit, if issued by the Texas Water Commission and the U.S. Environmental Protection Agency (EPA), will implement the requirements of the Hazardous and Solid Waste Amendments of 1984 (HSWA), amending the Federal Solid Waste Disposal Act, as amended, including all of the state authorized requirements as published through May 24, 1990, 55 Federal Register 21383. The TWC and EPA have entered into a joint permitting agreement whereby permits will be issued in Texas in accordance with the Texas Health and Safety Code, Chapter 361 (Vernon 1990), and RCRA, as amended. In order for the applicant to have a fully effective RCRA permit, both the TWC and the EPA must issue the permit. All permit provisions are fully enforceable under State and Federal law. The State of Texas has not received full HSWA authority. Areas in which the Texas Water Commission has not been authorized by EPA are denoted in the draft permit with an asterisk (*).

The TWC will provide an informal public hearing session if a written notice of opposition and request for hearing is received within 45 days of the date of publication of the notice of application. The written notice of opposition and request for such hearing must be accompanied by a statement that an aesthetic, conservational, recreational or economic interest of the requestor is or may be adversely affected by the granting of the application. It is presumed that residents, property owners or individuals doing business in the local area meet this test. Any person will be allowed to make oral or written statements at the informal public hearing session. The Executive Director of the TWC will consider any

information submitted in making a final recommendation and will respond in its recommendation to the TWC, and subsequently in writing at the time the final decision is made, to any significant comments made at or in connection in the informal public hearing session. EPA may participate in the informal public session of the public hearing.

No evidentiary public hearing will be held on this application unless an affected person who has received notice of the application has requested an evidentiary public hearing. Any such request for an evidentiary public hearing shall be in writing and contain (1) the name, mailing address and phone number of the person making the request, and (2) a brief description of how the requester, or persons represented by the requester, would be adversely affected by the granting of the application. If the TWC determines that the request sets out an issue which is relevant to the permit decision, or that an evidentiary public hearing would serve the public interest, the TWC shall conduct an evidentiary public hearing, after issuance of proper and timely notice of the hearing. If no sufficient request for hearing is received within 45 days of the date of publication of the notice concerning the application, the permit will be submitted to the TWC for final decision on the application.

The Texas Air Control Board (TACB) may appear at a public hearing and participate as a party to address air quality aspects of the application, pursuant to the Texas Health and Safety Code, Chapter 361 (Vernon 1990). The TACB may regulate air emissions from the facility through special provisions in any permit which is issued.

Decisions regarding the permit provisions issued under State authority may be reconsidered in response to a Motion for Rehearing and by appeal to a District Court in Travis County. Decisions regarding the permit provisions issued under federal authority may be reconsidered in accordance with procedures of 40 CFR §124.19.

Requests for a public hearing and/or requests for further information concerning this application should be submitted in writing to Cynthia G. Hayes, Assistant Chief Hearings Examiner, Texas Water Commission, P. O. Box 13087, Capitol Station, Austin, Texas 78711, telephone 512/463-7875. Written comments on the application should be submitted to the same address within 45 days of the date of publication of this notice of application. Information concerning any technical aspects of this permit can be obtained by contacting Charles Mauk at the same address or telephone 512/463-8142, and information concerning participating in hearings may be obtained by contacting the Public Interest Counsel, Mary Sahs, at the same address or telephone 512/463-8030.

Persons wishing to comment or request a hearing on a HSWA requirement denoted with an asterisk (*) in the draft permit should also notify, in writing, the Chief of the RCRA Permits Branch, Environmental Protection Agency Region 6, 1445 Ross Avenue, Dallas, Texas 75202-2733. Commission (TWC).

Issued this 25th day of August, 1992.

(SEAL)

Gloria A. Vasquez

Gloria A. Vasquez, Chief Clerk
Texas Water Commission

UNION CARBIDE

UNION CARBIDE CHEMICALS AND PLASTICS COMPANY INC.
P.O. BOX 8361, SOUTH CHARLESTON, WV 25303

July 13, 1992

Mr. John Rinehart
US Environmental Protection Agency
1445 Ross Avenue
Dallas, Texas 75202-2733

Subject: Clean Closure Demonstration
June 30th Meeting Update No. 2
Ball Mill Residue Basin & Disposal Pits
Brownsville, Texas
Proposed Permit No. HW-50318
Solid Waste Registration No. 31108

As promised in the July 1st letter from me to you, attached are the ground water elevation contour maps for the area surrounding the Ball Mill Residue Basin and the Disposal Pits. The first five contour maps are based upon facility-wide ground water elevation monitoring conducted in 1991 while the last map is based upon the elevations measured during the February 1992 clean closure demonstration ground water monitoring.

As expected, the general ground water flow pattern is from south to north while in the area immediately surrounding the subject solid waste management units the flow direction is towards the northwest. This is the historical flow pattern.

This flow pattern supports the argument that the Disposal Pits are the source of organics in the ground water. The highest concentrations of organics would be found at the source of contamination, the Disposal Pits, as verified by the high concentrations found in monitoring well MW-1 located right between the two Pits. Lower concentrations of organics would be found down-gradient of the source as verified by the lower concentrations found in monitoring wells MW-2, 3 & 5 located on the west, north and east sides of the Ball Mill Residue Basin.

Based upon this information, Union Carbide continues to believe that the Disposal Pits, not the Ball Mill Residue Basin, are the source of ground water contamination and that the ground water contamination should not prevent Union Carbide from being able to demonstrate clean closure for the Ball Mill Residue Basin.

As discussed at our June 30th meeting, Union Carbide is prepared to continue with the clean closure demonstration, However,

before consuming more resources into the effort, Union Carbide needs to know if your agency concurs with the statements in the previous paragraph. Therefore, I am requesting a letter from you as soon as possible stating your agency's position.

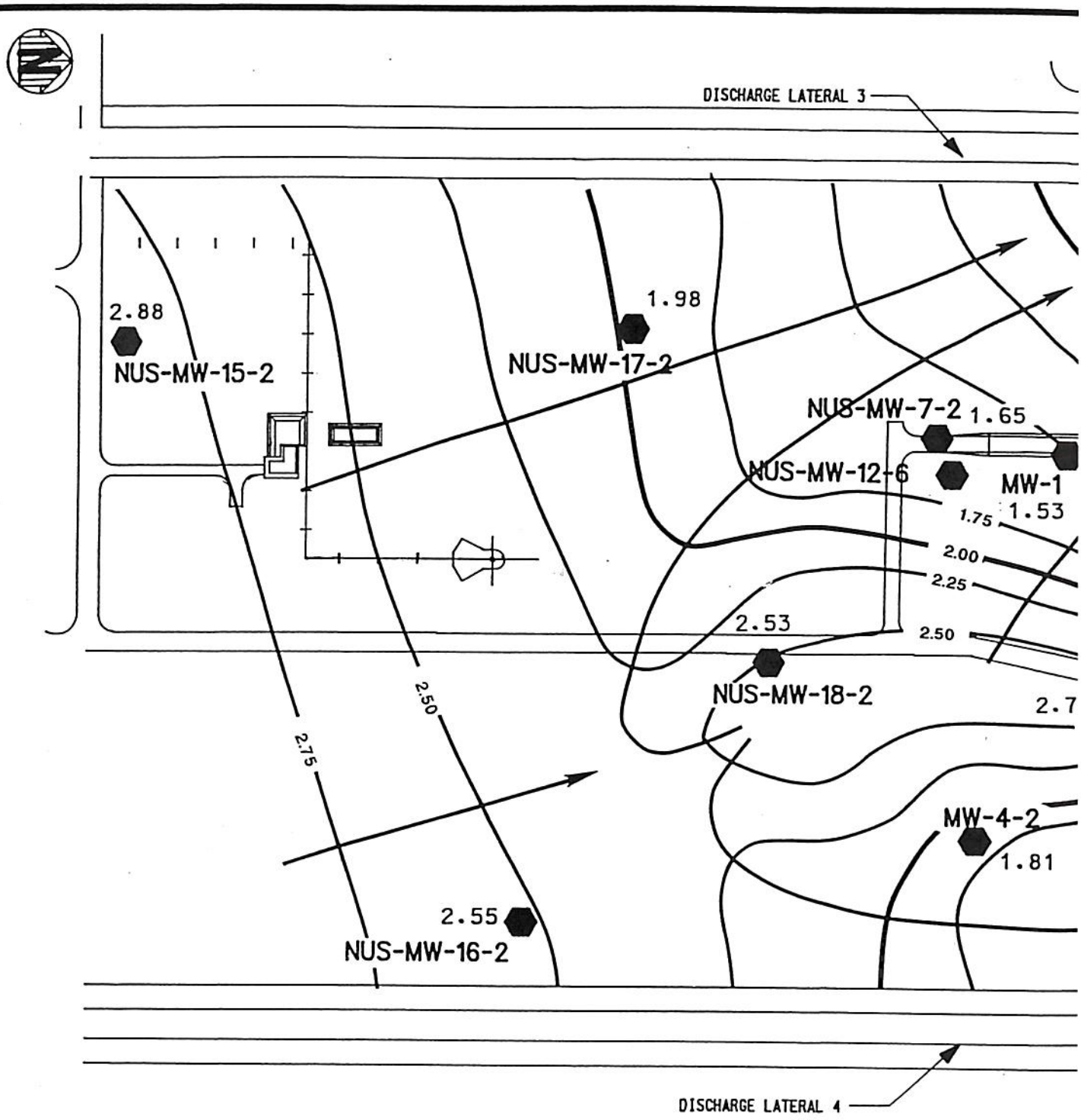
I will be on vacation from the 17th thru the 28th. However, if you need any further information or have reached a decision, please leave a message on my voice mail (304-747-3667). I will be routinely checking the voice mail and will immediately respond to your calls.

Very truly yours,

Alan C. Booth

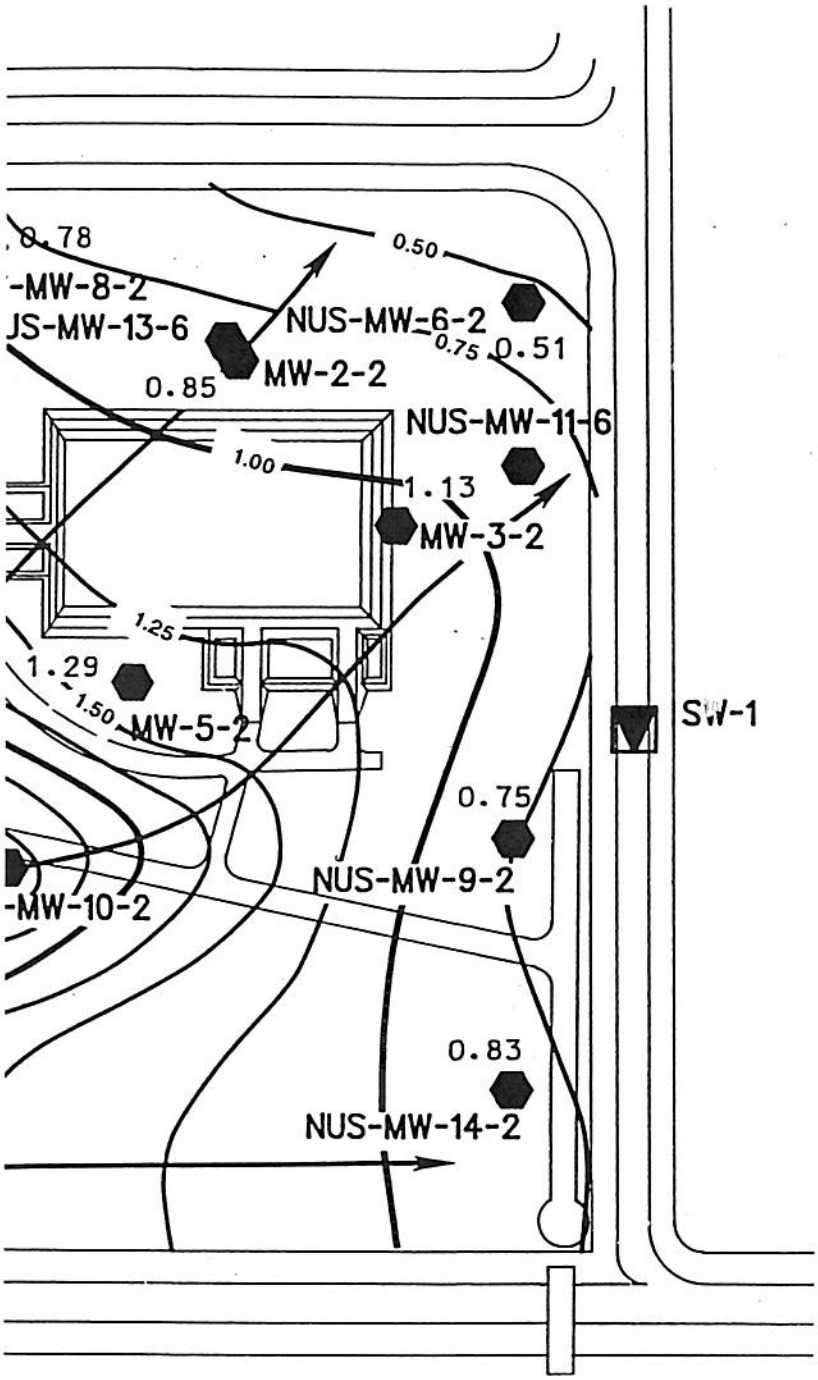
Alan C. Booth

Attachments (six contour maps)
ACB
basin6.doc
cc: Belia Cortez, UCC, Brownsville (w/ attach.)
Hoyt Clark, ENSR, Houston ("/")
Bobby O'Bryan, UCC, Texas City ("/")
Linda Steakley, NUS, Houston ("/")
Mark Tapp, UCC, League City ("/")



(0.81) LEGEND

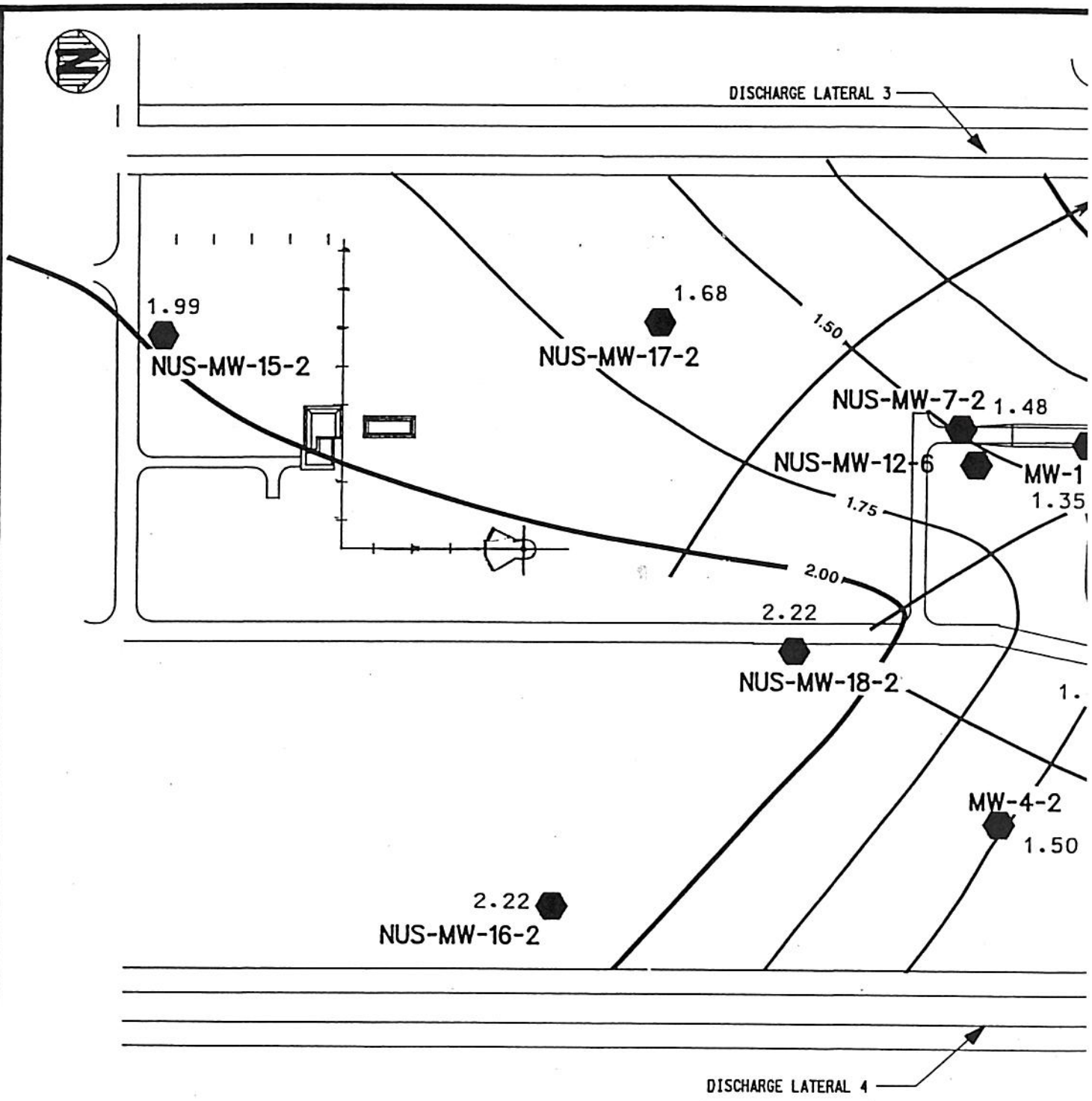
- MONITOR WELL LOCATION INDICATING STRATIGRAPHIC ZONE SCREENED (ZONES 2 OR 6)
- SURFACE WATER MEASURING STATION
- 1.00 — GROUNDWATER ELEVATION CONTOUR CONTOUR INTERVAL 0.25 FEET
- → ESTIMATED DIRECTION OF GROUNDWATER FLOW



NOTES:

1) ALL ELEVATIONS MEASURED WITH RESPECT TO A MEAN LOW TIDE DATUM GIVEN AS 8.95 ON UNION CARBIDE BENCHMARK STAMPED U.C.C.C. APRIL 1961. COORDINATES GIVEN AS N.3525; W.1500 EAST GRID.

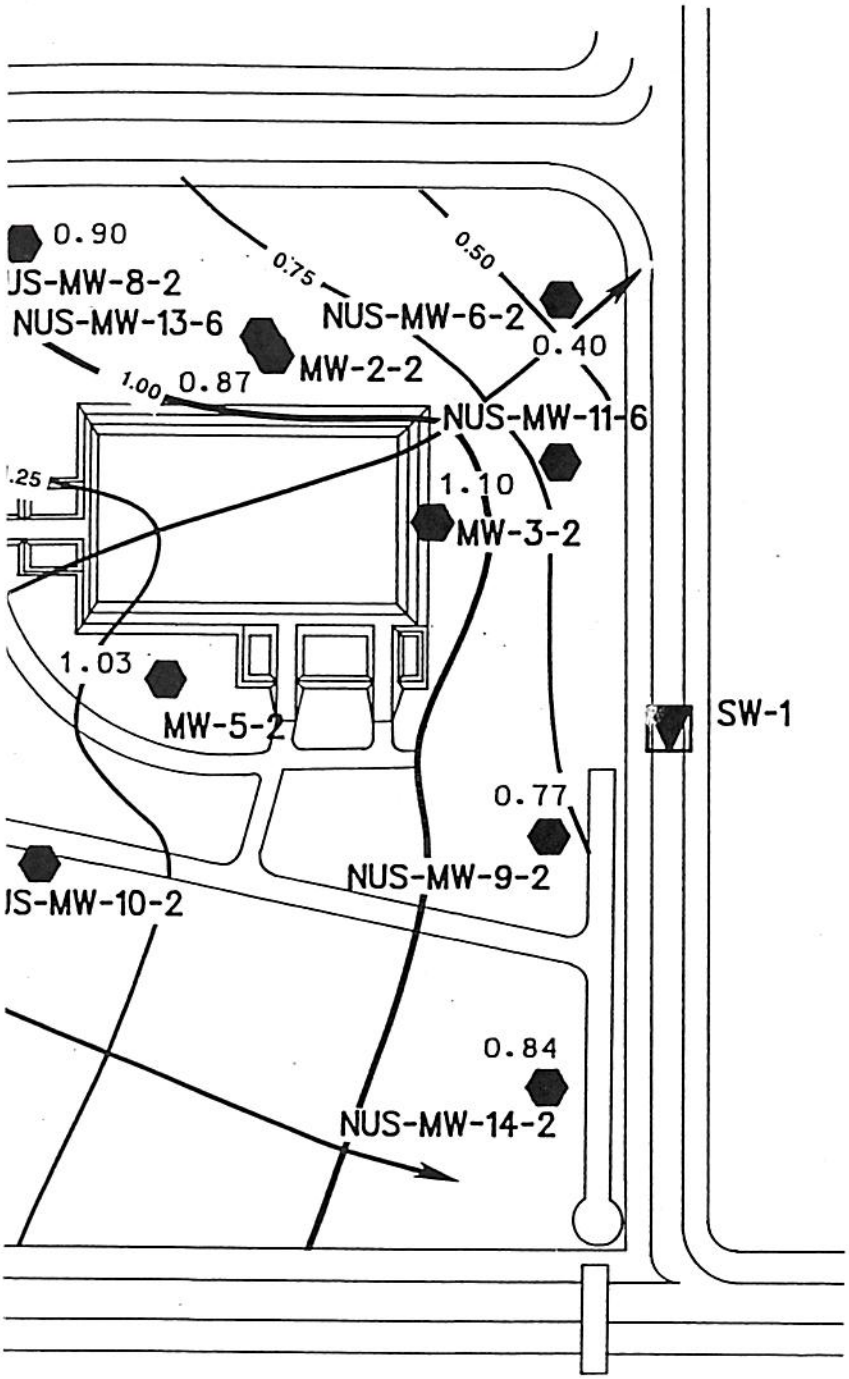
DRAWN BY	J. ATKINSON	GROUNDWATER ELEVATION CONTOUR MAP FOR ZONE 2 ON FEBRUARY 27, 1991 BALL MILL RESIDUE BASIN UNION CARBIDE CHEMICALS & PLASTICS CORP BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE:	07-08-92			
ENGINEER	D. GIBSON			
DATE:	07-08-92			
CAD DWG. NO.	3K312B01.DGN	SCALE: 1" = 150'-0"	NUS DWG. NO. 3K31-2B01 REV. 0	



(0.81)

LEGEND

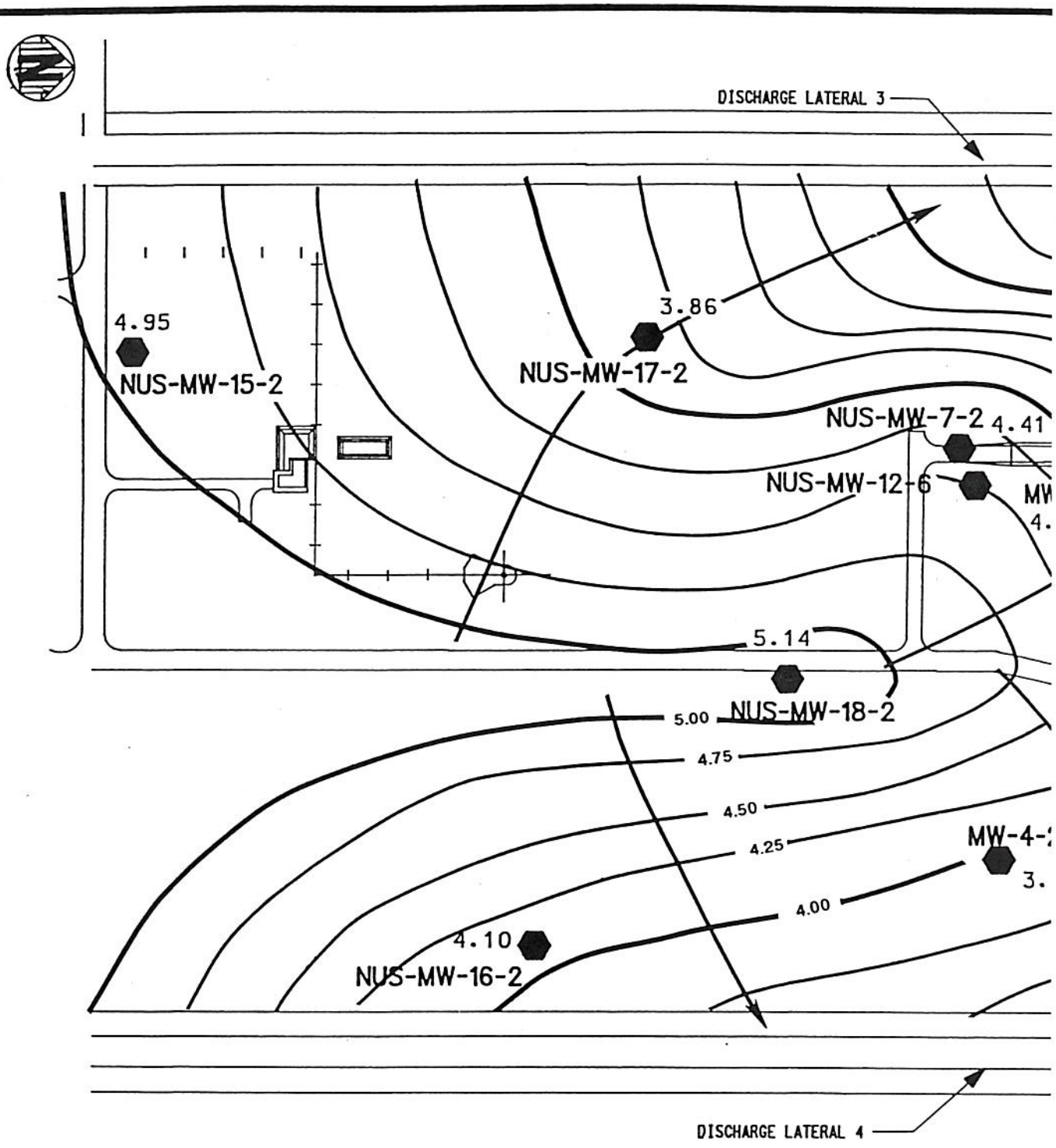
- MONITOR WELL LOCATION INDICATING STRATIGRAPHIC ZONE SCREENED (ZONES 2 OR 6)
- SURFACE WATER MEASURING STATION
- 1.00 GROUNDWATER ELEVATION CONTOUR CONTOUR INTERVAL 0.25 FEET
- ESTIMATED DIRECTION OF GROUNDWATER FLOW



NOTES:

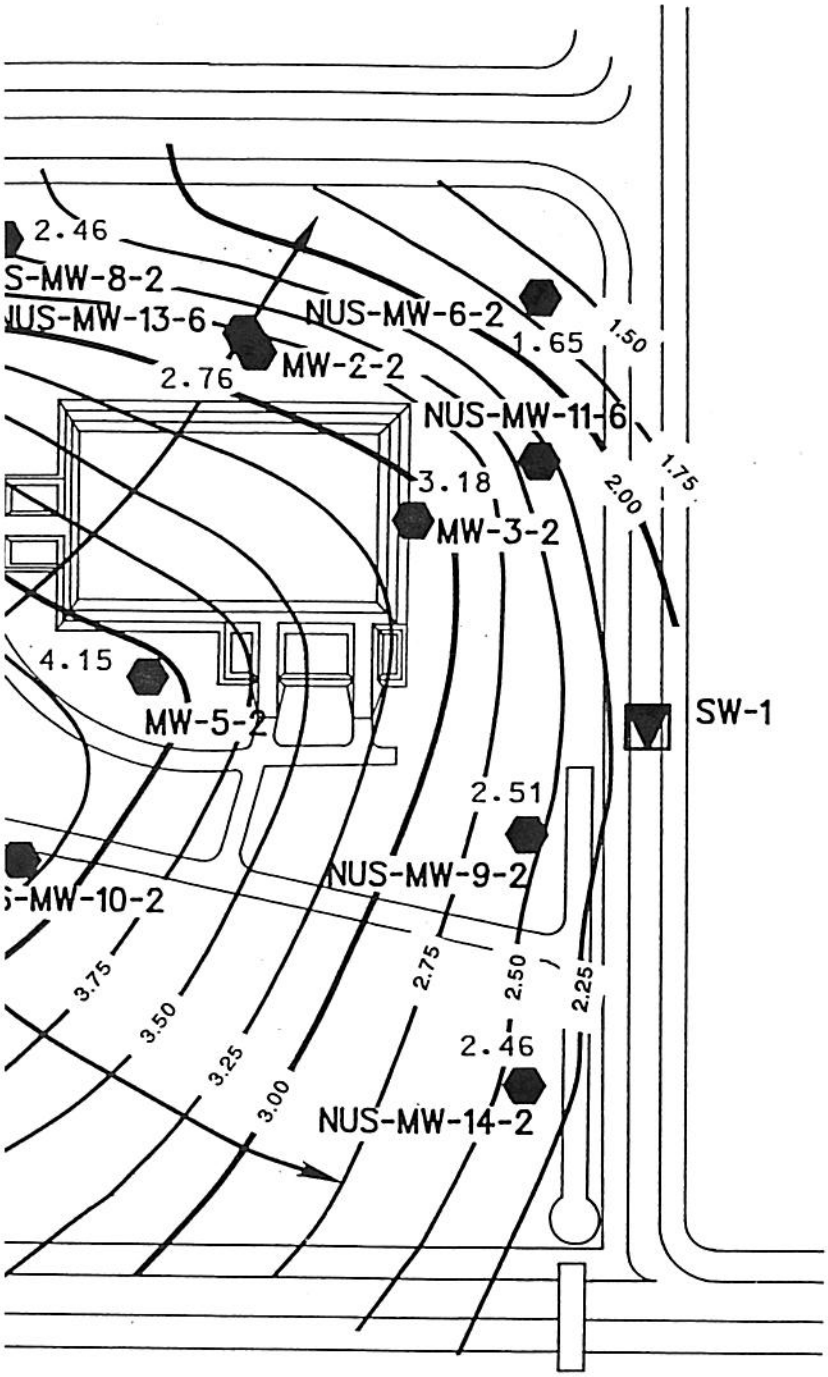
1) ALL ELEVATIONS MEASURED WITH RESPECT TO A MEAN LOW TIDE DATUM GIVEN AS 8.95 ON UNION CARBIDE BENCHMARK STAMPED U.C.C.C. APRIL 1961. COORDINATES GIVEN AS N.3525; W.1500 EAST GRID.

DRAWN BY	J. ATKINSON	GROUNDWATER ELEVATION CONTOUR MAP FOR ZONE 2 ON MARCH 22, 1991 BALL MILL RESIDUE BASIN UNION CARBIDE CHEMICALS & PLASTICS CORP BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE:	07-08-92			
ENGINEER	D. GIBSON			
DATE:	07-08-92			
CAD DWG. NO.	3K312B01.DGN	SCALE: 1" = 150'-0"	NUS DWG. NO. 3K31-2B02 REV. 0	



(0.81) LEGEND

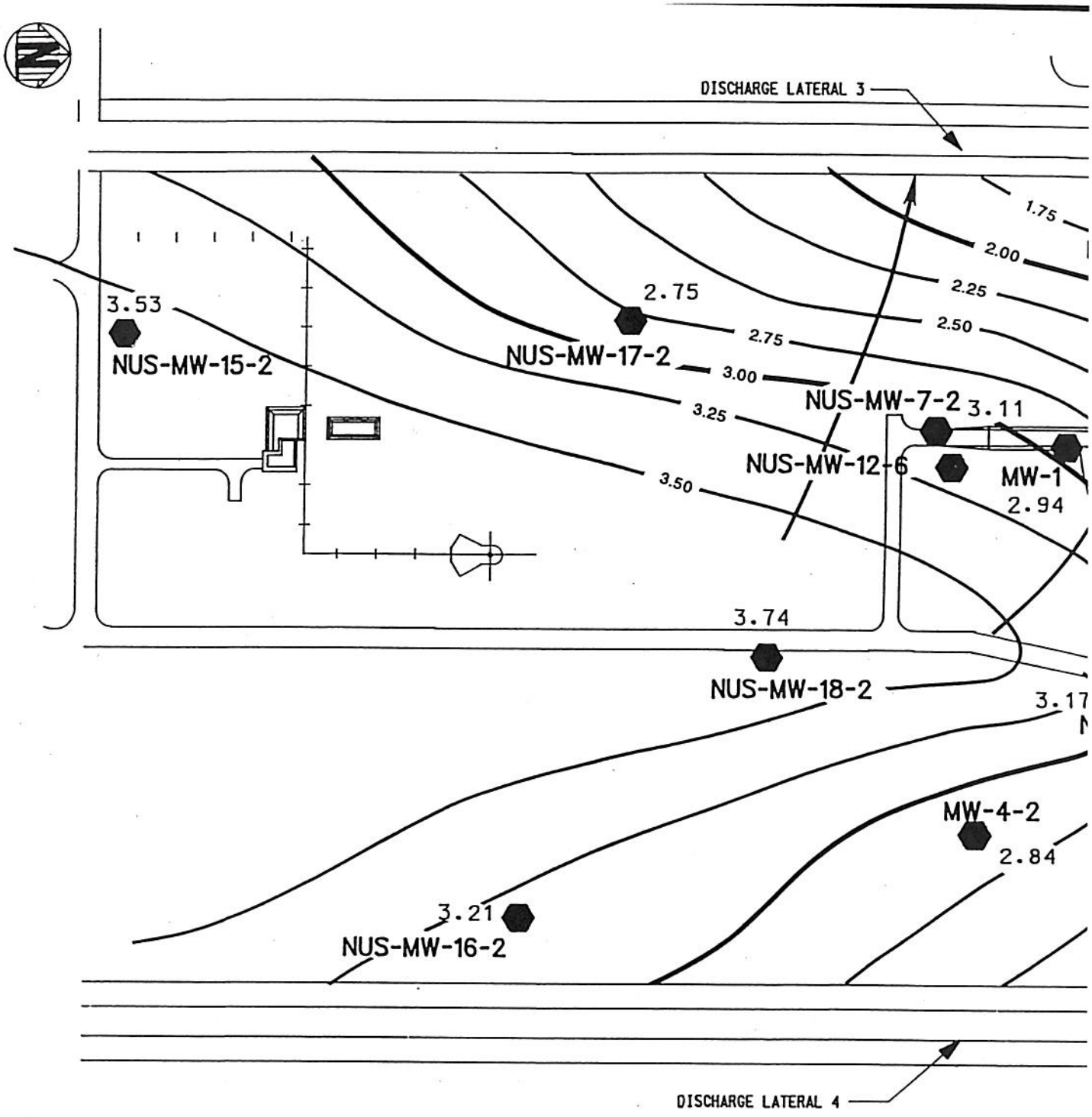
- MONITOR WELL LOCATION INDICATING STRATIGRAPHIC ZONE SCREENED (ZONES 2 OR 6)
- SURFACE WATER MEASURING STATION
- 1.00 — GROUNDWATER ELEVATION CONTOUR CONTOUR INTERVAL 0.25 FEET
- ESTIMATED DIRECTION OF GROUNDWATER FLOW



NOTES:

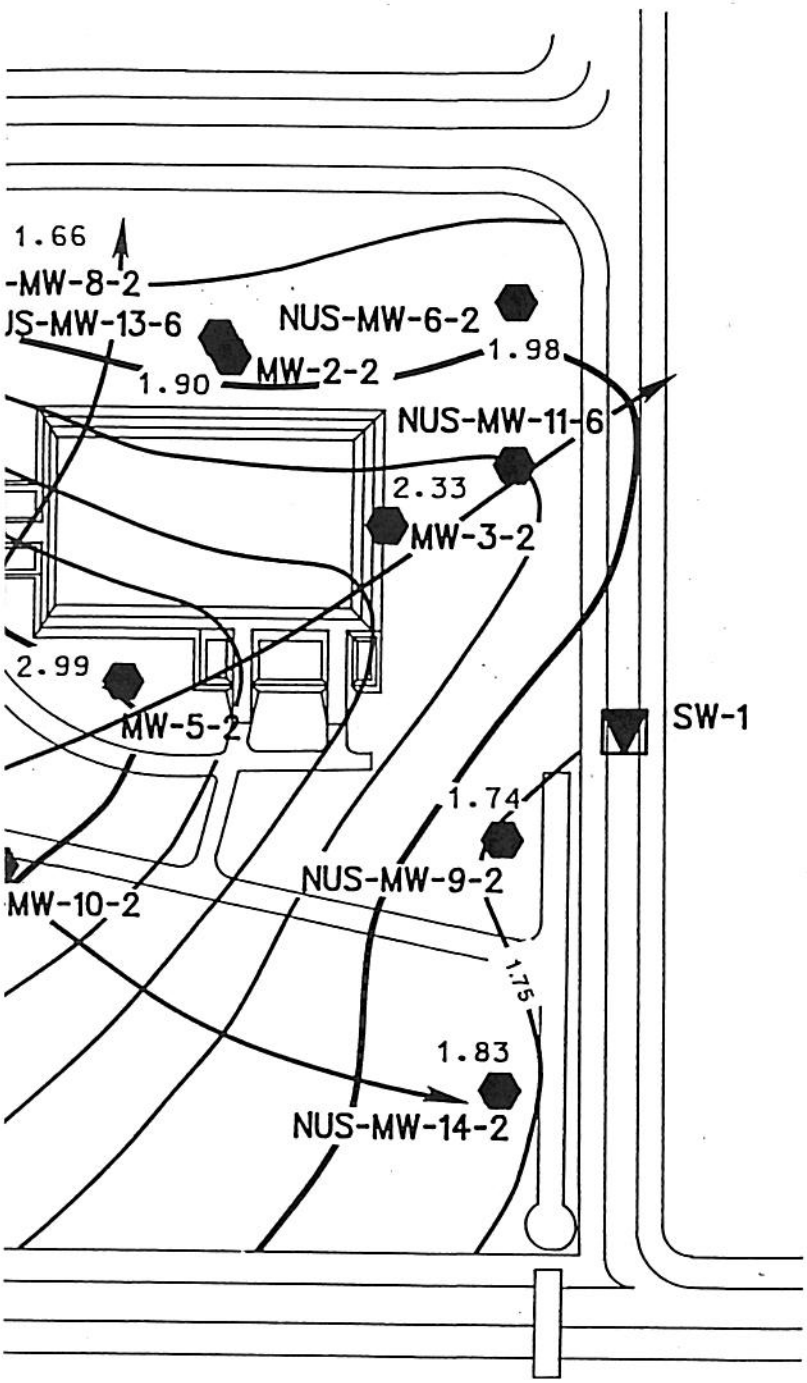
1) ALL ELEVATIONS MEASURED WITH RESPECT TO A MEAN LOW TIDE DATUM GIVEN AS 8.95 ON UNION CARBIDE BENCHMARK STAMPED U.C.C.C. APRIL 1961. COORDINATES GIVEN AS N.3525; W.1500 EAST GRID.

DRAWN BY	J. ATKINSON	GROUNDWATER ELEVATION CONTOUR MAP FOR ZONE 2 ON APRIL 28, 1992 BALL MILL RESIDUE BASIN UNION CARBIDE CHEMICALS & PLASTICS CORP BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE:	07-08-92			
ENGINEER	D. GIBSON			
DATE:	07-08-92			
CAD DWG. NO.	3K312B01.DGN	SCALE: 1" = 150'-0"	NUS DWG. NO. 3K31-2B03 REV. 0	



(0.81) LEGEND

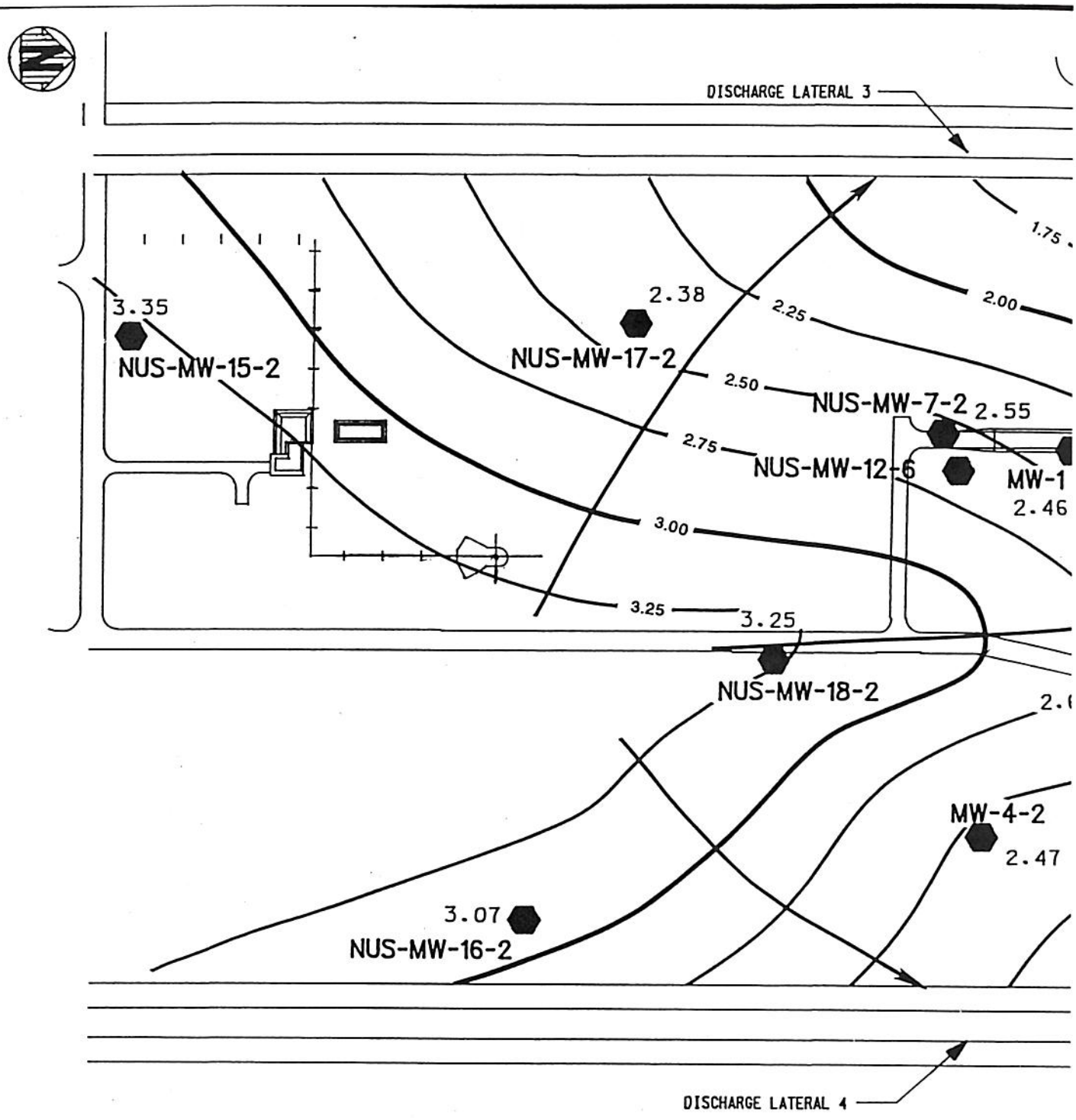
- MONITOR WELL LOCATION INDICATING STRATIGRAPHIC ZONE SCREENED (ZONES 2 OR 6)
- SURFACE WATER MEASURING STATION
- 1.00 GROUNDWATER ELEVATION CONTOUR CONTOUR INTERVAL 0.25 FEET
- ESTIMATED DIRECTION OF GROUNDWATER FLOW



NOTES:

1) ALL ELEVATIONS MEASURED WITH RESPECT TO A MEAN LOW TIDE DATUM GIVEN AS 8.95 ON UNION CARBIDE BENCHMARK STAMPED U.C.C.C. APRIL 1961. COORDINATES GIVEN AS N.3525; W.1500 EAST GRID.

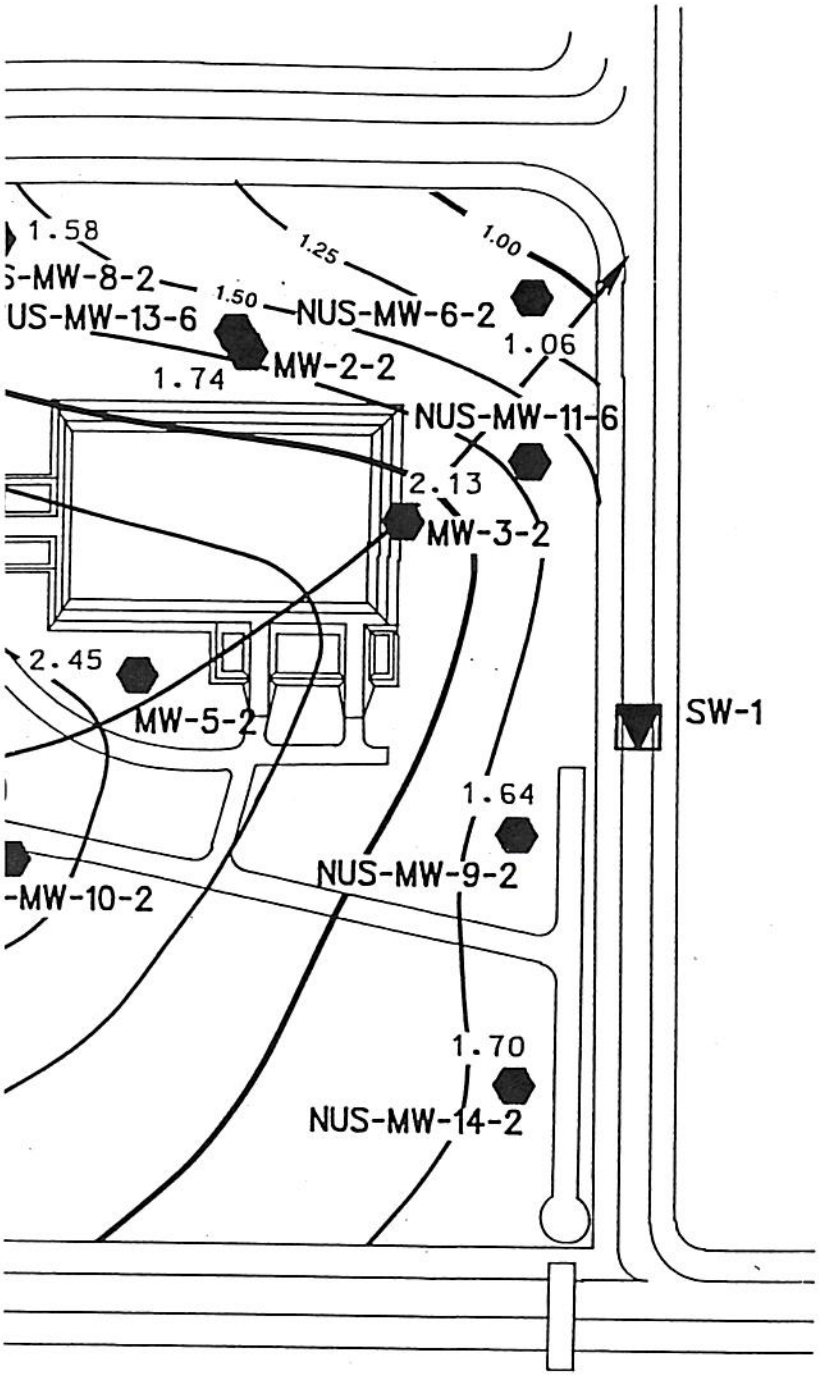
DRAWN BY	J. ATKINSON	GROUNDWATER ELEVATION CONTOUR MAP FOR ZONE 2 ON APRIL 29, 1991 BALL MILL RESIDUE BASIN UNION CARBIDE CHEMICALS & PLASTICS CORP BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE:	07-08-92			
ENGINEER	D. GIBSON			
DATE:	07-08-92			
CAD DWG. NO.	3K312B01.DGN	SCALE: 1" = 150'-0"	NUS DWG. NO. 3K31-2B04 REV. 0	



(0.81)

LEGEND

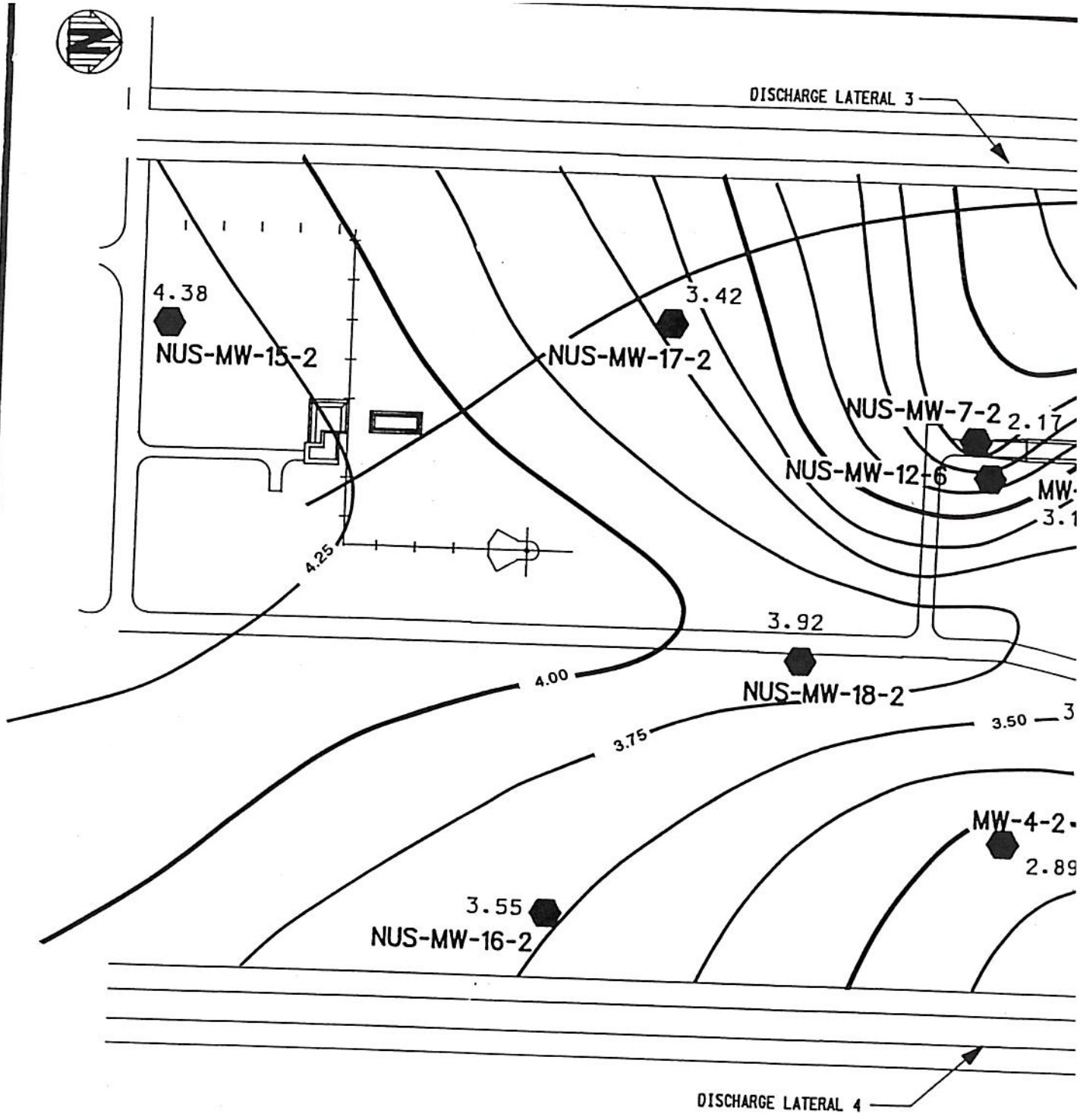
- MONITOR WELL LOCATION INDICATING STRATIGRAPHIC ZONE SCREENED (ZONES 2 OR 6)
- SURFACE WATER MEASURING STATION
- 1.00 — GROUNDWATER ELEVATION CONTOUR CONTOUR INTERVAL 0.25 FEET
- ESTIMATED DIRECTION OF GROUNDWATER FLOW



NOTES:

1) ALL ELEVATIONS MEASURED WITH RESPECT TO A MEAN LOW TIDE DATUM GIVEN AS 8.95 ON UNION CARBIDE BENCHMARK STAMPED U.C.C.C. APRIL 1961. COORDINATES GIVEN AS N.3525; W.1500 EAST GRID.

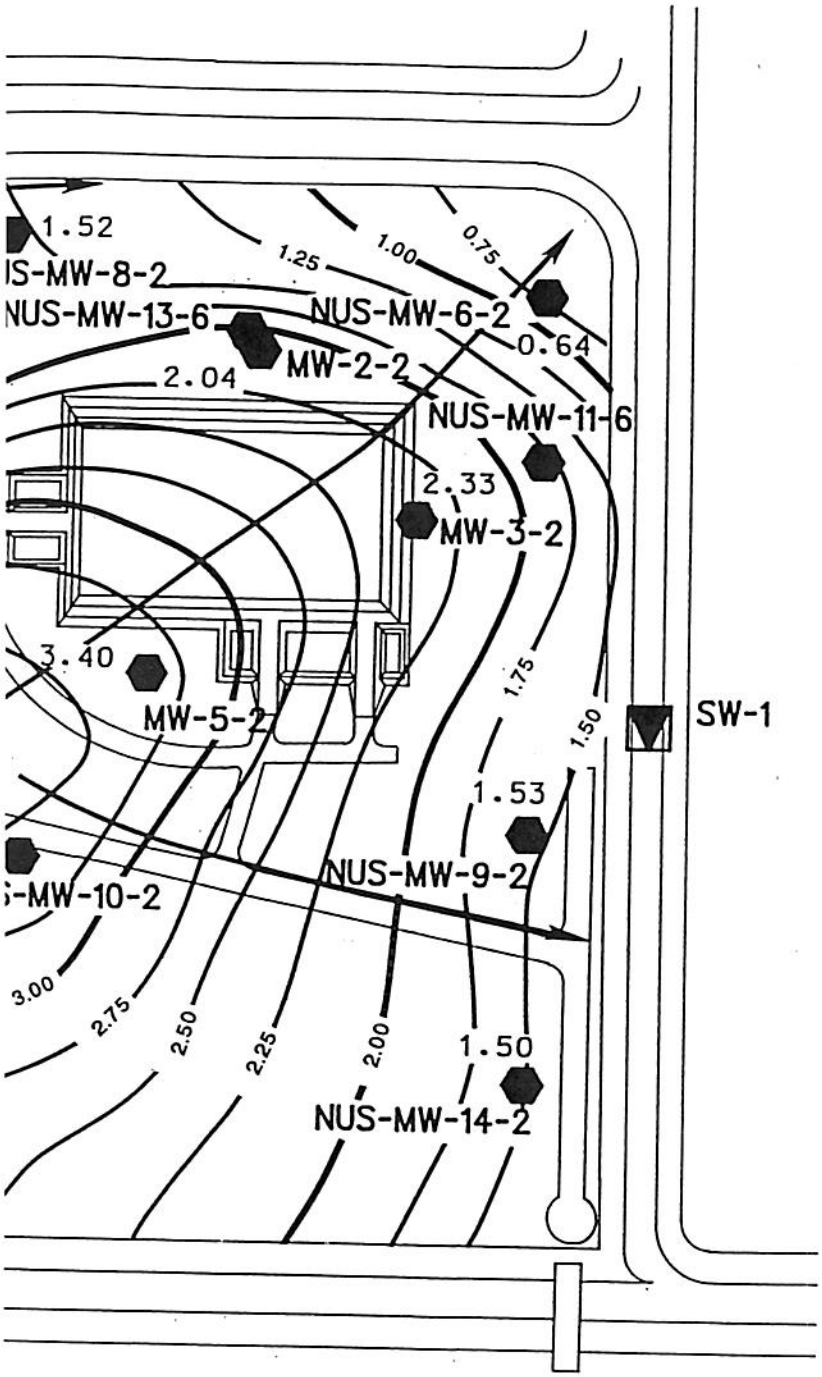
DRAWN BY	J. ATKINSON	GROUNDWATER ELEVATION CONTOUR MAP FOR ZONE 2 ON MAY 29, 1991 BALL MILL RESIDUE BASIN UNION CARBIDE CHEMICALS & PLASTICS CORP BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE:	07-08-92			
ENGINEER	D. GIBSON			
DATE:	07-08-92			
CAD DWG. NO.	3K312B01.DGN	SCALE: 1" = 150'-0"	NUS DWG. NO. 3K31-2B05 REV. 0	



(0.81)

LEGEND

- MONITOR WELL LOCATION INDICATING STRATIGRAPHIC ZONE SCREENED (ZONES 2 OR 6)
- SURFACE WATER MEASURING STATION
- 1.00 — GROUNDWATER ELEVATION CONTOUR CONTOUR INTERVAL 0.25 FEET
- ESTIMATED DIRECTION OF GROUNDWATER FLOW



NOTES:

1) ALL ELEVATIONS MEASURED WITH RESPECT TO A MEAN LOW TIDE DATUM GIVEN AS 8.95 ON UNION CARBIDE BENCHMARK STAMPED U.C.C.C. APRIL 1961. COORDINATES GIVEN AS N.3525; W.1500 EAST GRID.

DRAWN BY	J. ATKINSON	GROUNDWATER ELEVATION CONTOUR MAP FOR ZONE 2 ON JUNE 24, 1991 BALL MILL RESIDUE BASIN UNION CARBIDE CHEMICALS & PLASTICS CORP BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE:	07-08-92			
ENGINEER	D. GIBSON			
DATE:	07-08-92			
CAD DWG. NO.	3K312B01.DGN	SCALE: 1" = 150'-0"	NUS DWG. NO. 3K31-2806 REV. 0	

UNION CARBIDE CHEMICALS AND PLASTICS COMPANY INC.
P O BOX 8361, SOUTH CHARLESTON, WV 25303

July 1, 1992

Mr. John Rinehart
US Environmental Protection Agency
1445 Ross Avenue
Dallas, Texas 75202-2733

Subject: Clean Closure Demonstration
June 30th Meeting Update
Ball Mill Residue Basin & Disposal
Brownsville, Texas
Proposed Permit No. HW-50318
Solid Waste Registration No. 31108

At the June 30th meeting I mentioned that the TWC had changed the ground water detection monitoring system for the Ball Mill Residue Basin in the draft post-closure care permit due to an apparent shift in ground water flow direction in the area surrounding the basin.

All of the ground water monitoring events through February 1989 indicated that the predominant flow pattern in the area of the basin was from south to north as shown in the attached figure for May 24, 1988. Based upon this flow pattern the original draft permit had MW-4, MW-7 and MW-1 (supplement) as the background wells and MW-2, MW-3 and MW-5 as the compliance wells.

However, information from ground water monitoring in August 1989, January 1990 and September 1990 suggested that the predominant flow pattern in the area of the basin had changed to a northwest to southeast orientation as shown in the attached figure for September 1990. Based on this data, the TWC has modified the draft permit to have MW-2, MW-3 and MW-6 as the background wells and MW-5, plus two additional wells, as the compliance wells.

Union Carbide believes that the original flow pattern is still the dominant pattern and that a detection monitoring system configuration similar to the original is the correct one to use. This is based upon facility-wide ground water elevation measuring performed between November 1990 and June 1991. Attached are the facility-wide contour maps developed from the elevation measurements. The dates of the elevation measurements are:

11/16/90	02/27/91*	05/29/91*
12/17/90	03/22/91*	06/24/91*
01/28/91	04/29/91*	

The facility-wide contour maps show that the surface impoundments operated by the Brownsville Navigation District located near the southwest corner of the facility establishes the flow pattern throughout the facility. The dominant ground water flow direction near the basin is consistently south to north.

Union Carbide is having contour maps developed for the above asterisked dates (dates when ground water elevations were measured for all wells near the basin) and for the recent (February 1992) ground water quality sampling event. These maps will show the detailed flow pattern in the area surrounding the basin. These maps will be sent to you as soon as they are available.

Union Carbide plans to communicate this information to the TWC.

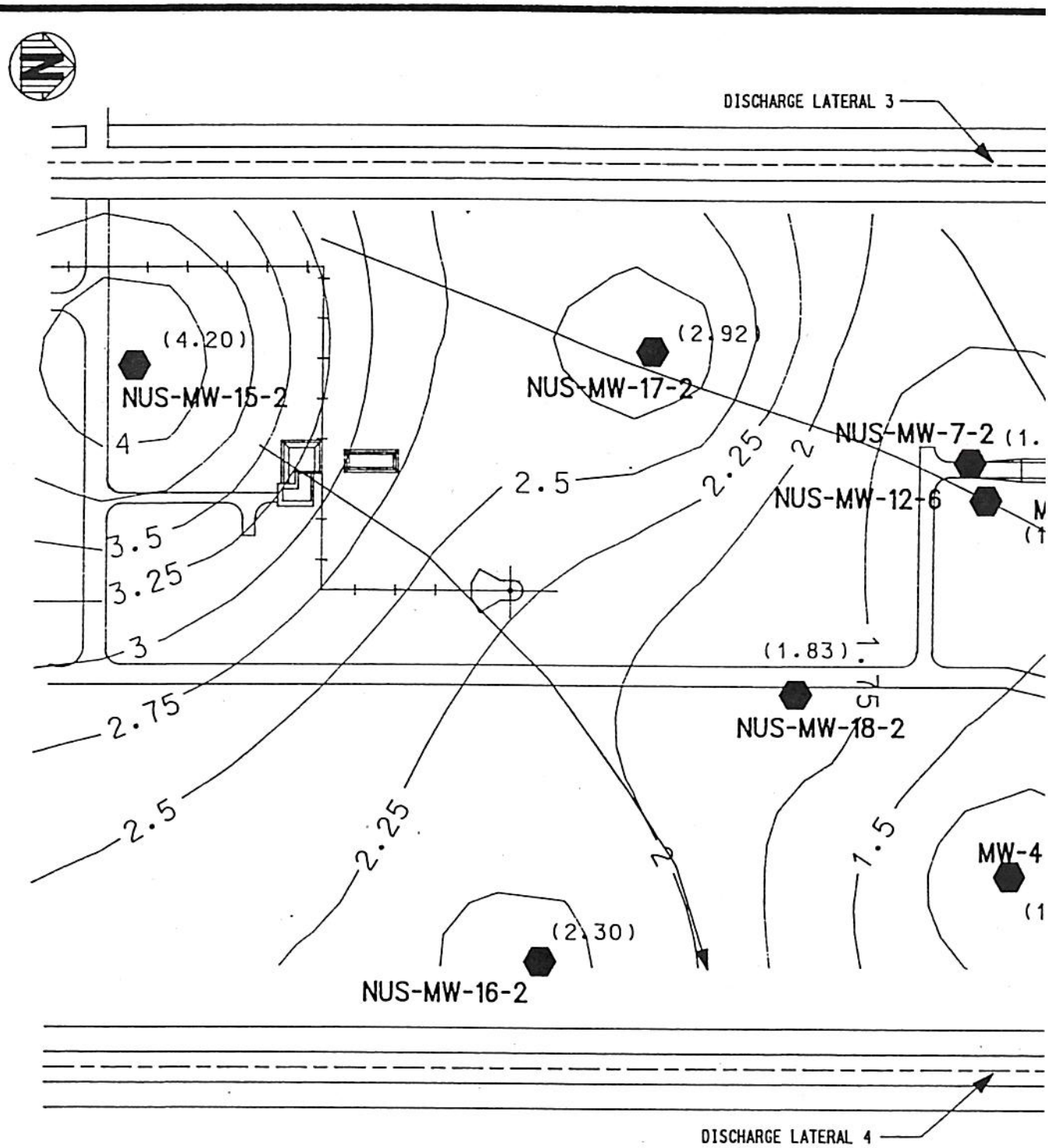
Please call me (304-747-3667) if you have any questions or concerns.

Very truly yours,

Alan C. Booth

Alan C. Booth

Attachments
ACB
basin5.doc
cc: Belia Cortez, UCC, Brownsville
Hoyt Clark, ENSR, Houston
Bobby O'Bryan, UCC, Texas City
Linda Steakley, NUS, Houston
Mark Tapp, UCC, League City

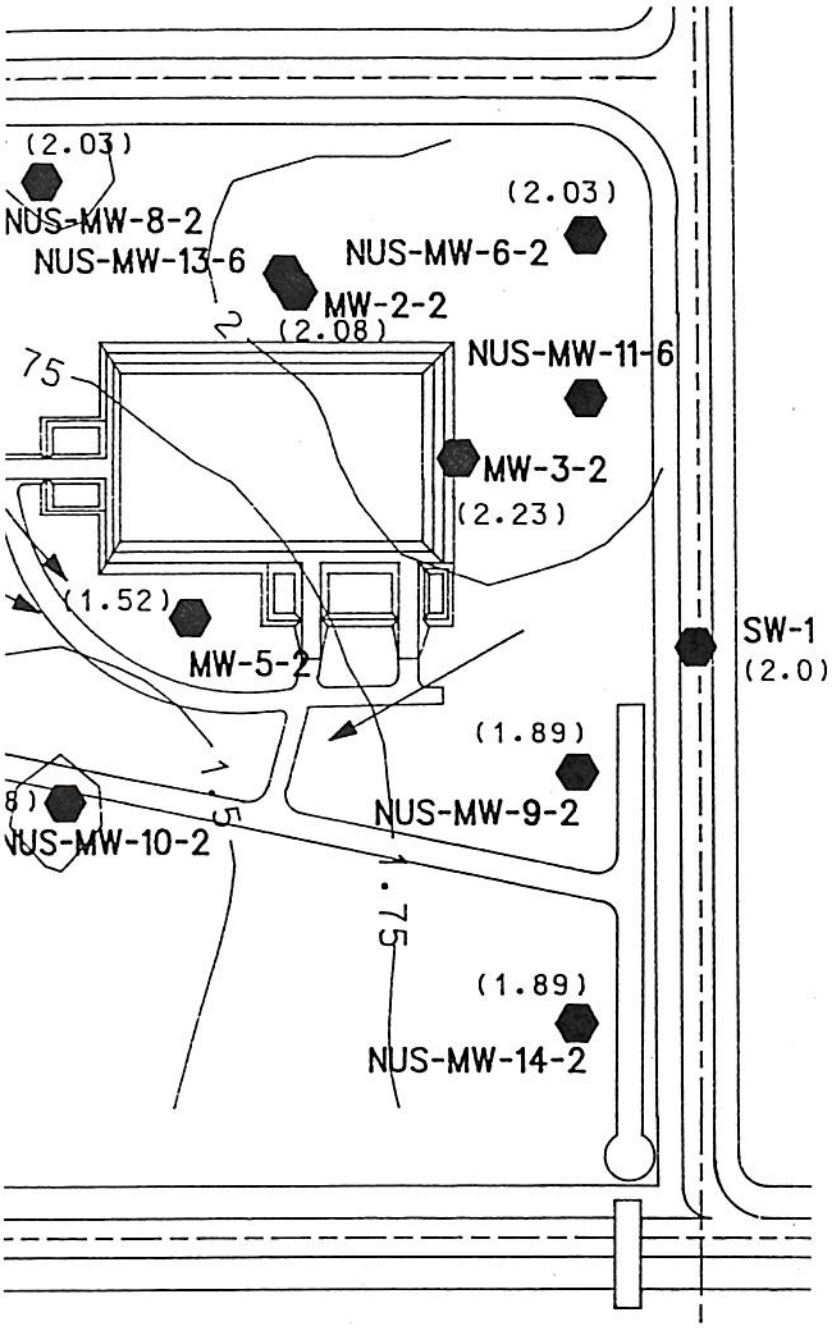


(0.81)

LEGEND

- MONITOR WELL LOCATION INDICATING STRATIGRAPHIC ZONE SCREENED (ZONES 2 OR 6)
- SURFACE WATER MEASURING STATION
- 1.00 — GROUNDWATER ELEVATION CONTOUR CONTOUR INTERVAL 0.25 FEET
- → ESTIMATED DIRECTION OF GROUNDWATER FLOW

REF. DWG. NO. BALLMILL.
REF. DWG. NO. 710M2001.

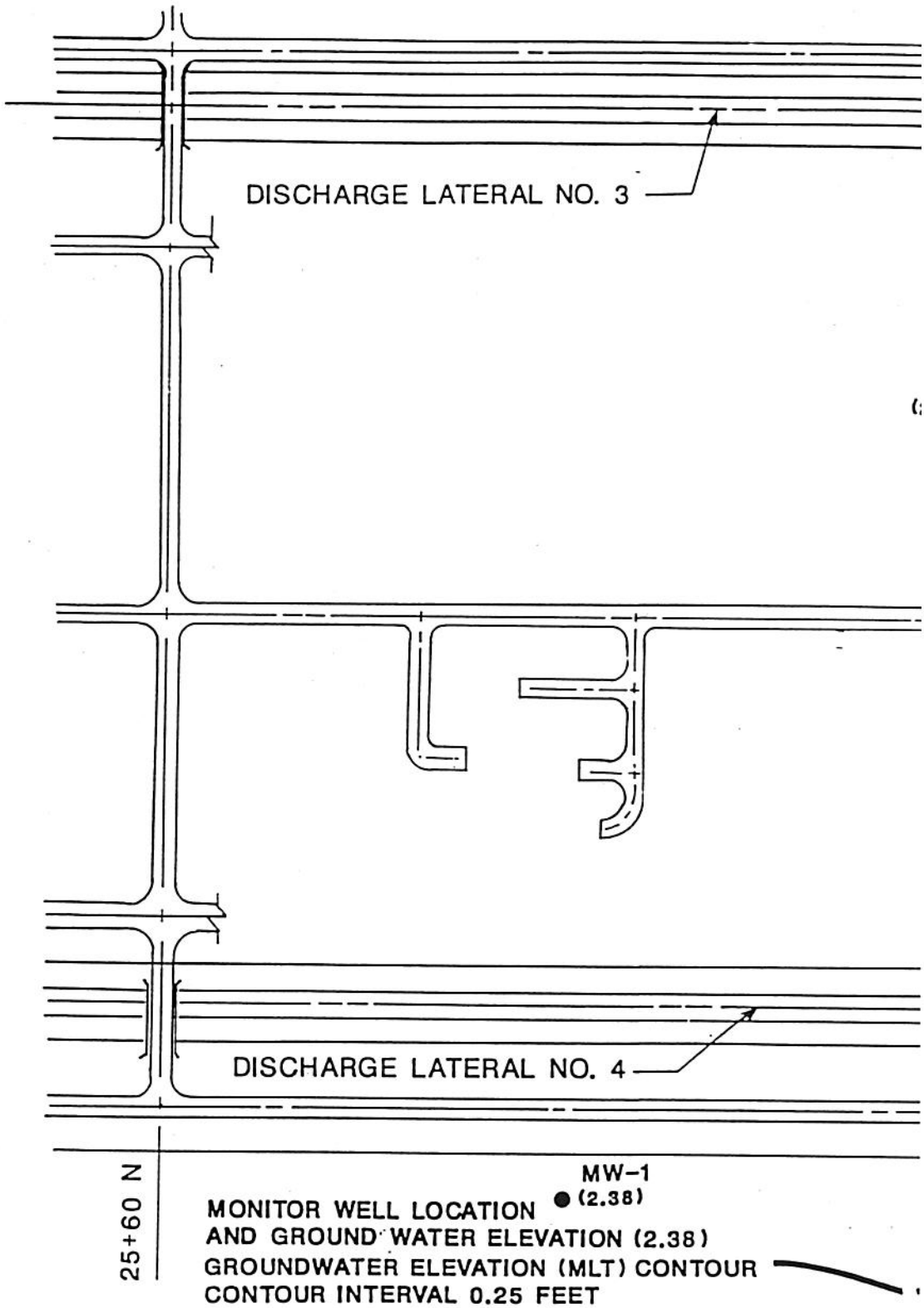


NOTES:

1) ALL ELEVATIONS MEASURED WITH RESPECT TO A MEAN LOW TIDE DATUM GIVEN AS 8.95 ON UNION CARBIDE BENCHMARK STAMPED U.C.C.C. APRIL 1961, COORDINATES GIVEN AS N.3525; W.1500 EAST GRID.

DRAWN BY M. GREEN	GROUNDWATER ELEVATION CONTOUR MAP FOR ZONE 2 ON SEPTEMBER 13, 1990 BALL MILL RESIDUE BASIN UNION CARBIDE CHEMICALS & PLASTICS CORP BROWNSVILLE, TEXAS	NUS CORPORATION GULF COAST DIVISION A Halliburton Company
DATE: NOVEMBER 1990		
ENGINEER M. HARRIS		
DATE: NOVEMBER 1990		
CAD DWG. NO. 94032B01.DGN	SCALE: 1" = 150'-0" NUS DWG. NO. 9403-2B1 REV. 1	

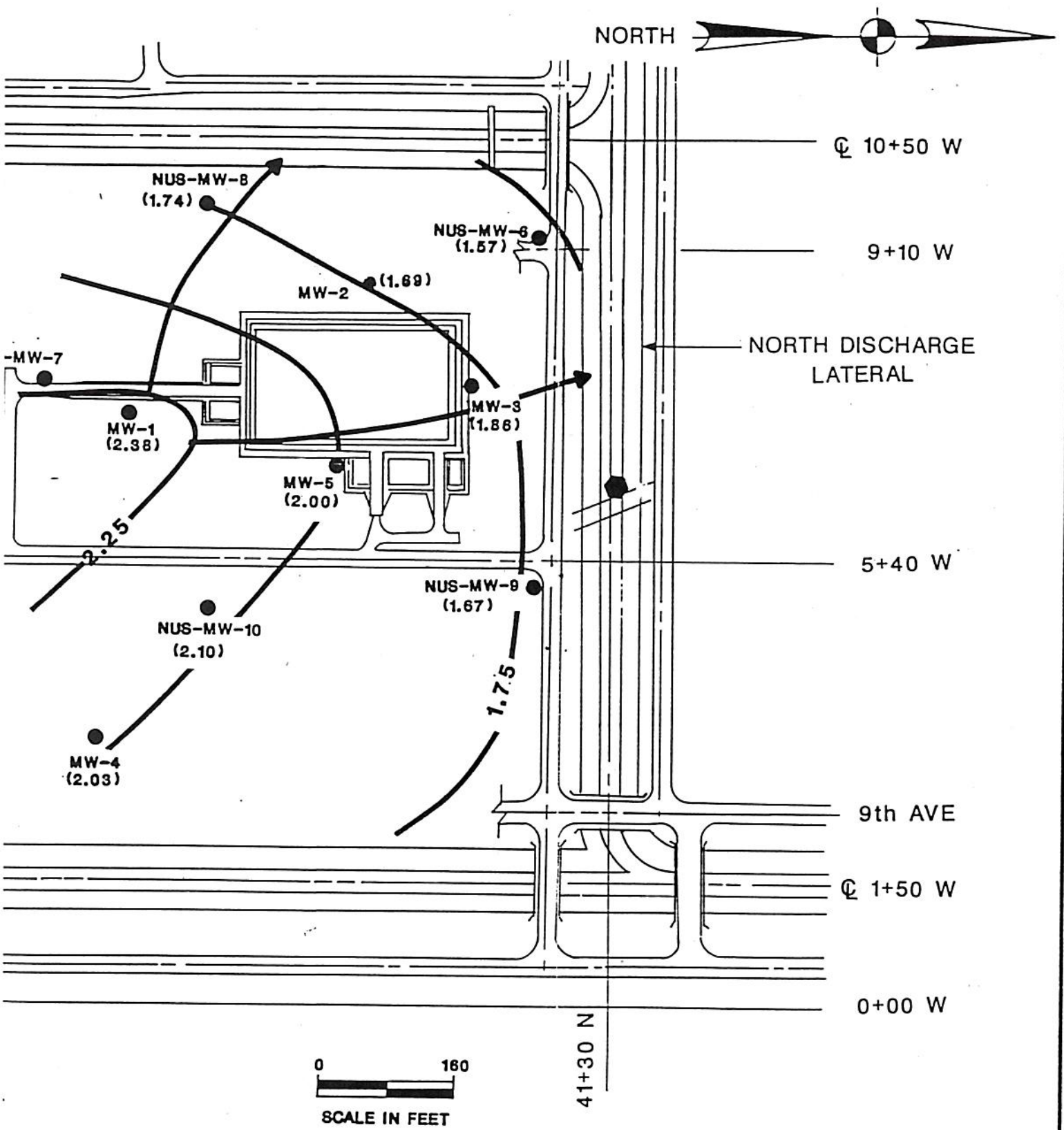
LS 1 & 50



NOTE:

ELEVATION MEASURED WITH RESPECT TO A MEAN LC

FOR ELEVATION WITH RESPECT TO MEAN SEA LEVEL



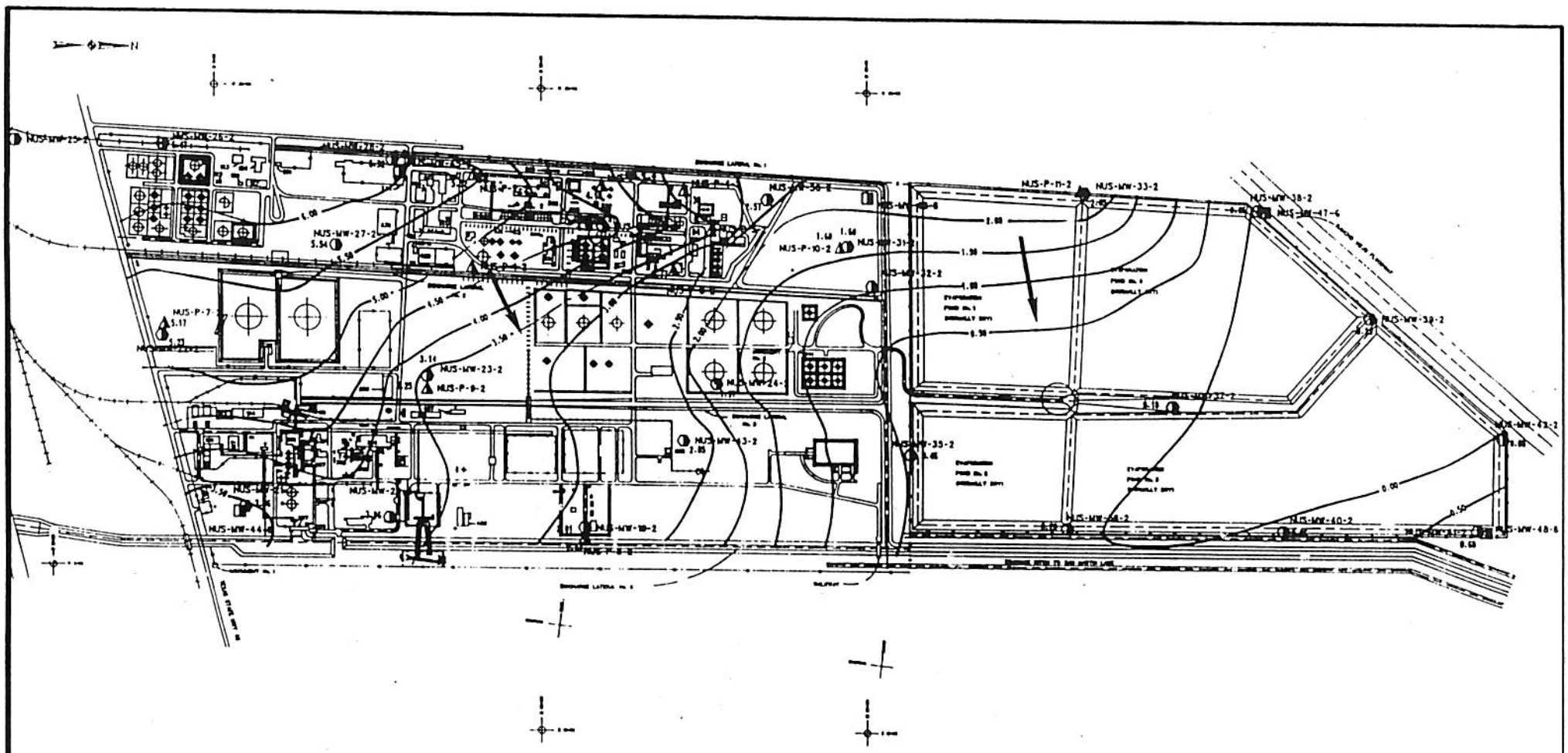
IDE (MLT) DATUM

ITRACT 0.94 FEET

GROUND WATER ELEVATION CONTOURS
FOR WELLS SCREENED IN ZONE 2
FEBRUARY 1989
BALL MILL RESIDUE BASIN
UNION CARBIDE CORPORATION
BROWNSVILLE, TEXAS

DATE MAY 89 | FIGURE

NUS CORPORATION



NOTES:

1. The Union Carbide Brownsville, Texas Plant has not operated since 1983.
2. Drawing excerpted from Union Carbide Drawing Numbers 838920-00 (Revised 1982) and Number 840265-99.
3. Groundwater elevations with respect to Mean Sea Level.
4. Contour interval is 0.50 feet.

LEGEND:

-1.00- Contour interval line

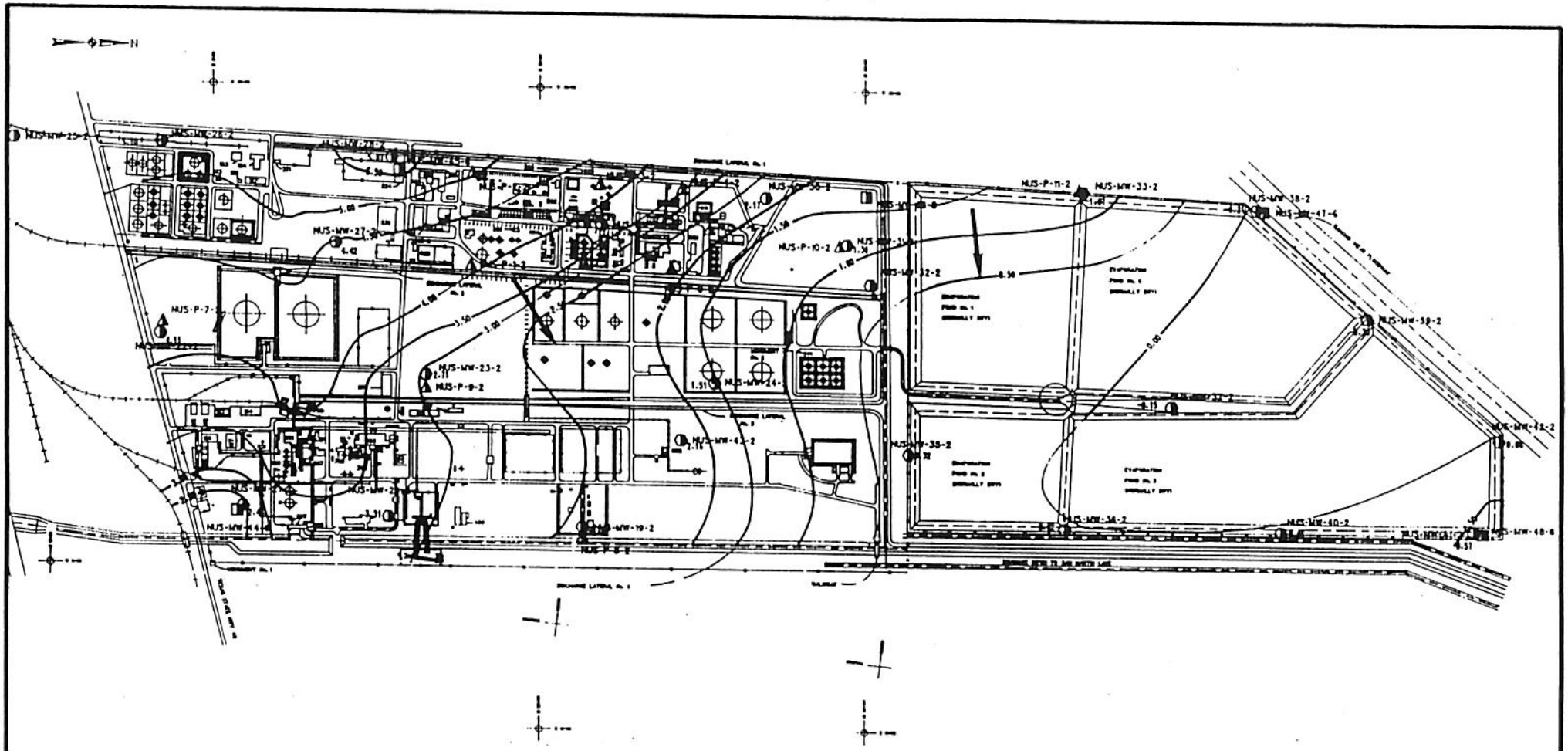
Groundwater flow direction

REFERENCE DRAWINGS
710N2001.DGN LEVELS - 1,2
710N2005.DGN LEVELS - 1,3

FIGURE 3 10

REVISED 7-28-81

DRAWN BY M. GREEN	GROUNDWATER ELEVATION CONTOURS FOR WELLS SCREENED IN ZONE 2 NOVEMBER 16, 1990 UCC&P BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE: 2-12-91			
ENGINEER D. GIBSON			
DATE: 2-12-91			
CAD DWG. NO. 710N2820.DGN	SCALE: 1" = 600'	HNUS DWG. NO. 710M-2820	REV. 0



NOTES:

1. The Union Carbide Brownsville, Texas Plant has not operated since 1983.
2. Drawing excerpted from Union Carbide Drawing Numbers 838920-00 (Revised 1982) and Number 840265-99.
3. Groundwater elevations with respect to Mean Sea Level.
4. Contour interval is 0.50 feet.

LEGEND:

-6.00- Contour interval line

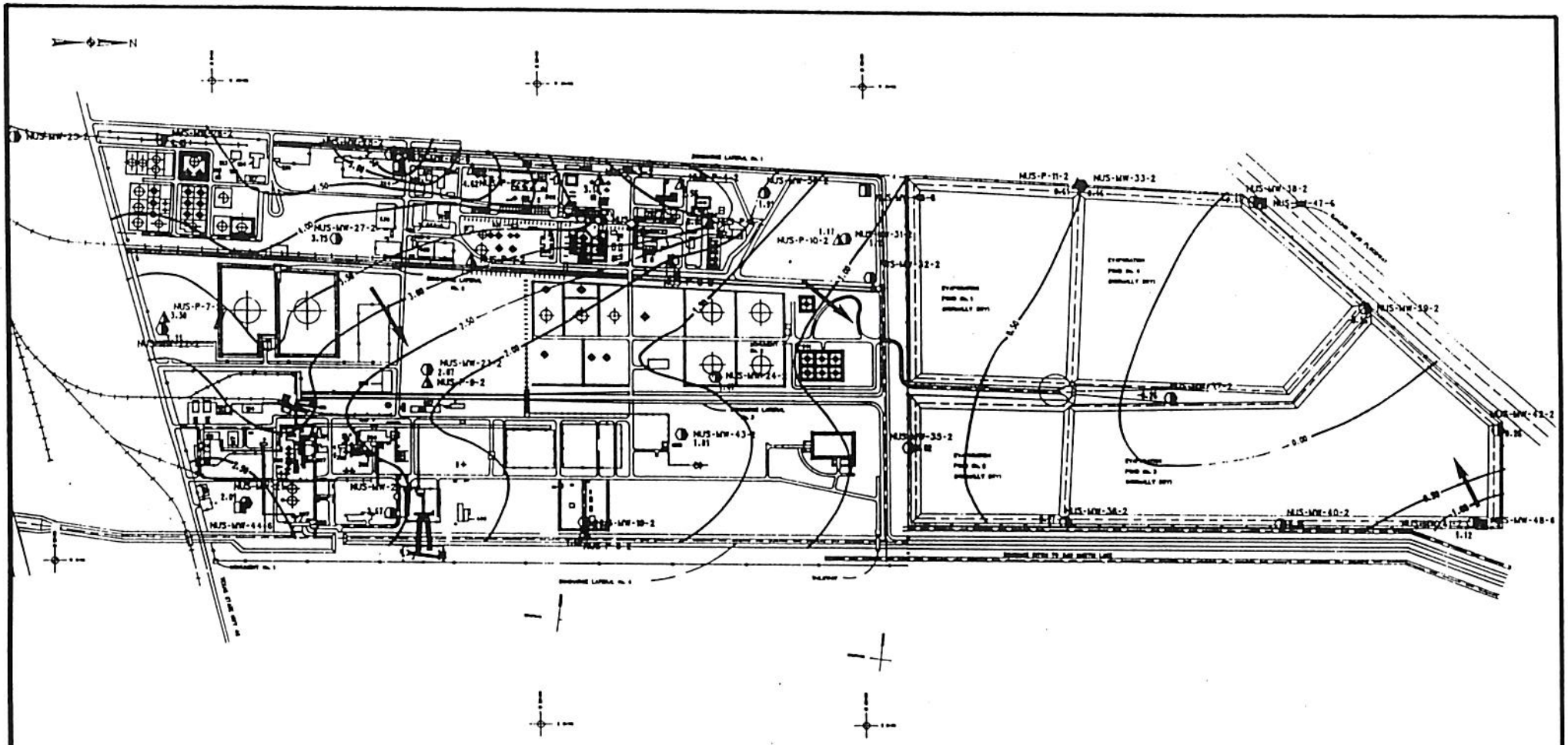
Groundwater flow direction

REFERENCE DRAWINGS
710M2001.DGN LEVELS - 1,2
710M2005.DGN LEVELS - 1,3

FIGURE 3-11

REVISED 7-28-91

DRAWN BY M. GREEN	GROUNDWATER ELEVATION CONTOURS FOR WELLS SCREENED IN ZONE 2 DECEMBER 17, 1990 UCC&P BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE: 2-12-91			
ENGINEER D. GIBSON			
DATE: 2-12-91			
CAD DWG. NO. 710M2820.DGN	SCALE: 1" = 600'	HUS DWG. NO. 710M-2821 REV. 0	



NOTES:

1. The Union Carbide Brownsville, Texas Plant has not operated since 1983.
2. Drawing excerpted from Union Carbide Drawing Numbers 838920-00 (Revised 1982) and Number 840265-99.
3. Groundwater elevations with respect to Mean Sea Level.
4. Contour interval is 0.50 feet.

LEGEND:

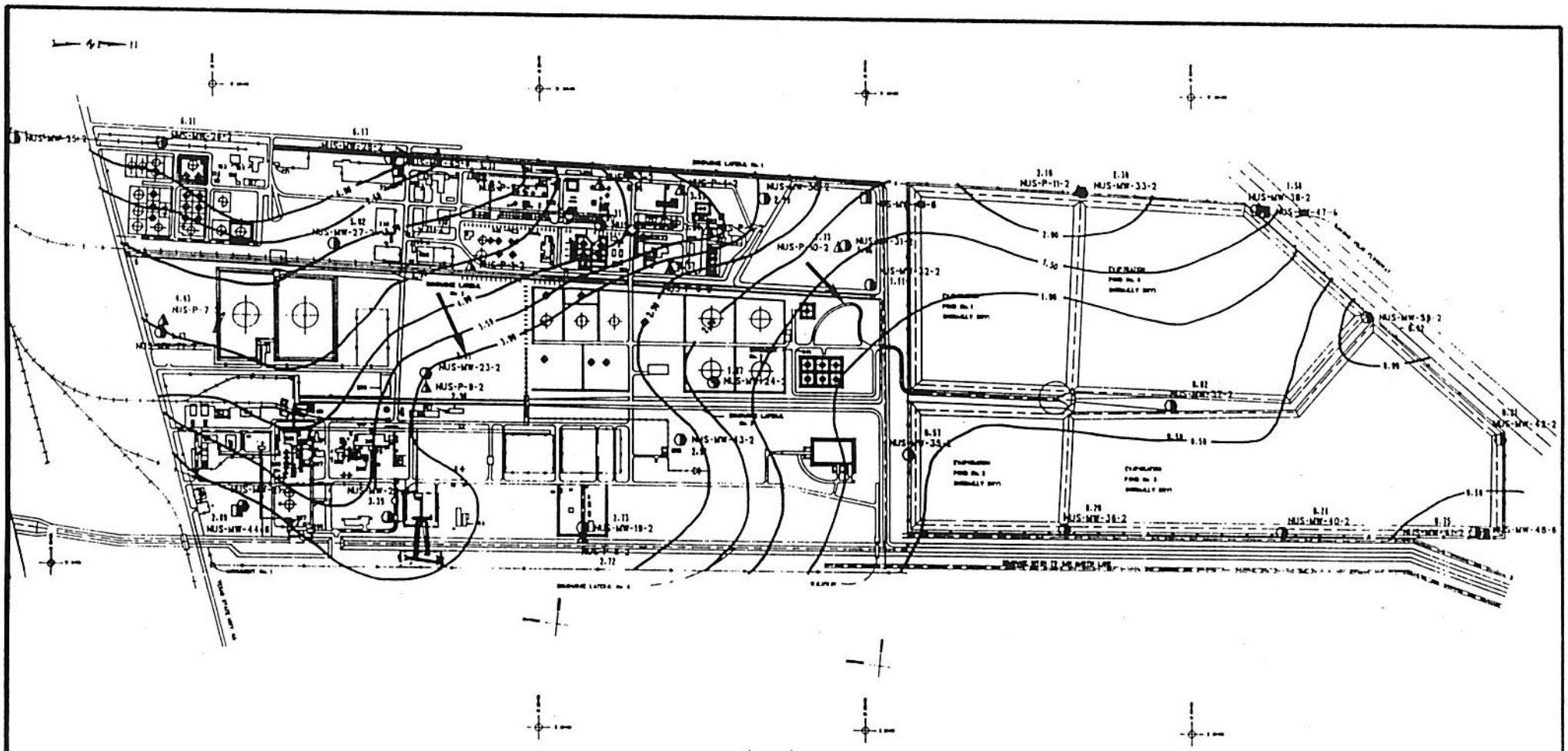
- Contour interval line
- Groundwater flow direction

REFERENCE DRAWINGS
710M2001.DGN LEVELS - 1,2
710M2005.DGN LEVELS - 1,3

FIGURE 3-12

REVISED 7-28-91

DRAWN BY M. GREEN	GROUNDWATER ELEVATION CONTOURS FOR WELLS SCREENED IN ZONE 2 JANUARY 28, 1991 UCC&P BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE: 2-12-91			
ENGINEER D. GIBSON			
DATE: 2-12-91			
CAD DWG. NO. 710M2820.DGN	SCALE: 1" = 600'	HNUS DWG. NO. 710M-2822	REV. 0



NOTES:

1. The Union Carbide Brownsville, Texas Plant has not operated since 1983.
2. Drawing excerpted from Union Carbide Drawing Numbers 838920-00 (Revised 1982) and Number 840265-99.
3. Groundwater elevations with respect to Mean Sea Level.
4. Contour interval is 0.50 feet.

LEGEND:

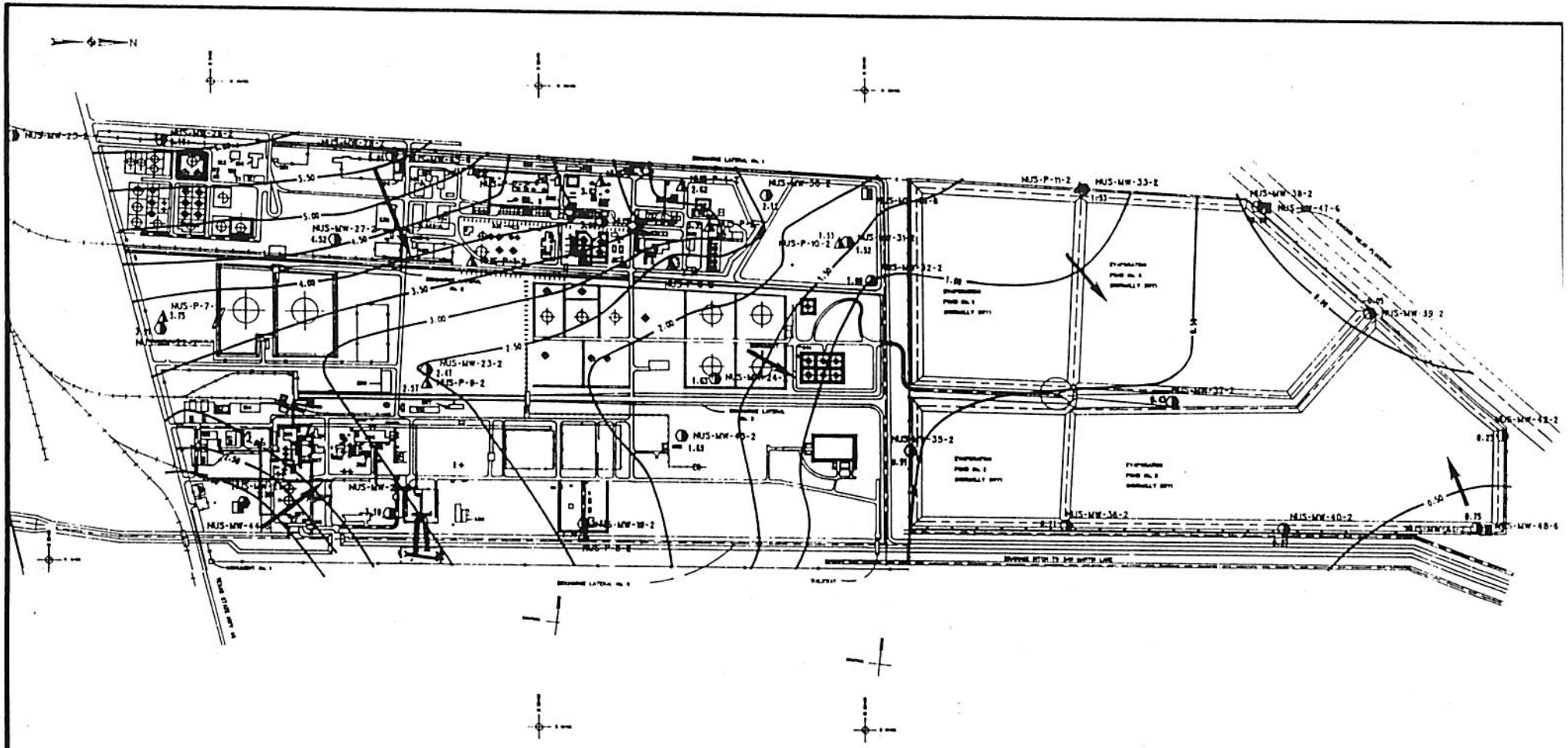
- Contour interval line
- Groundwater flow direction

REFERENCE DRAWINGS
710N2001.DGN LEVELS - 1,2
710N2005.DGN LEVELS - 1,3

FIGURE 3-13

REVISED 7-28-91

DRAWN BY M. GREEN	GROUNDWATER ELEVATION CONTOURS FOR WELLS SCREENED IN ZONE 2 FEBRUARY 27, 1991 UCC&P BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE: 2-12-91			
ENGINEER D. GIBSON			
DATE: 2-12-91			
CAD DWG. NO. 710N2820.DGN	SCALE: 1" = 600'	NUS DWG. NO. 710M-2836	REV. 0



NOTES:

1. The Union Carbide Brownsville, Texas Plant has not operated since 1983.
2. Drawing excerpted from Union Carbide Drawing Numbers 838920-00 (Revised 1982) and Number 840265-99.
3. Groundwater elevations with respect to Mean Sea Level.
4. Contour Interval is 0.50 feet.

LEGEND:

6.00 — Contour Interval line

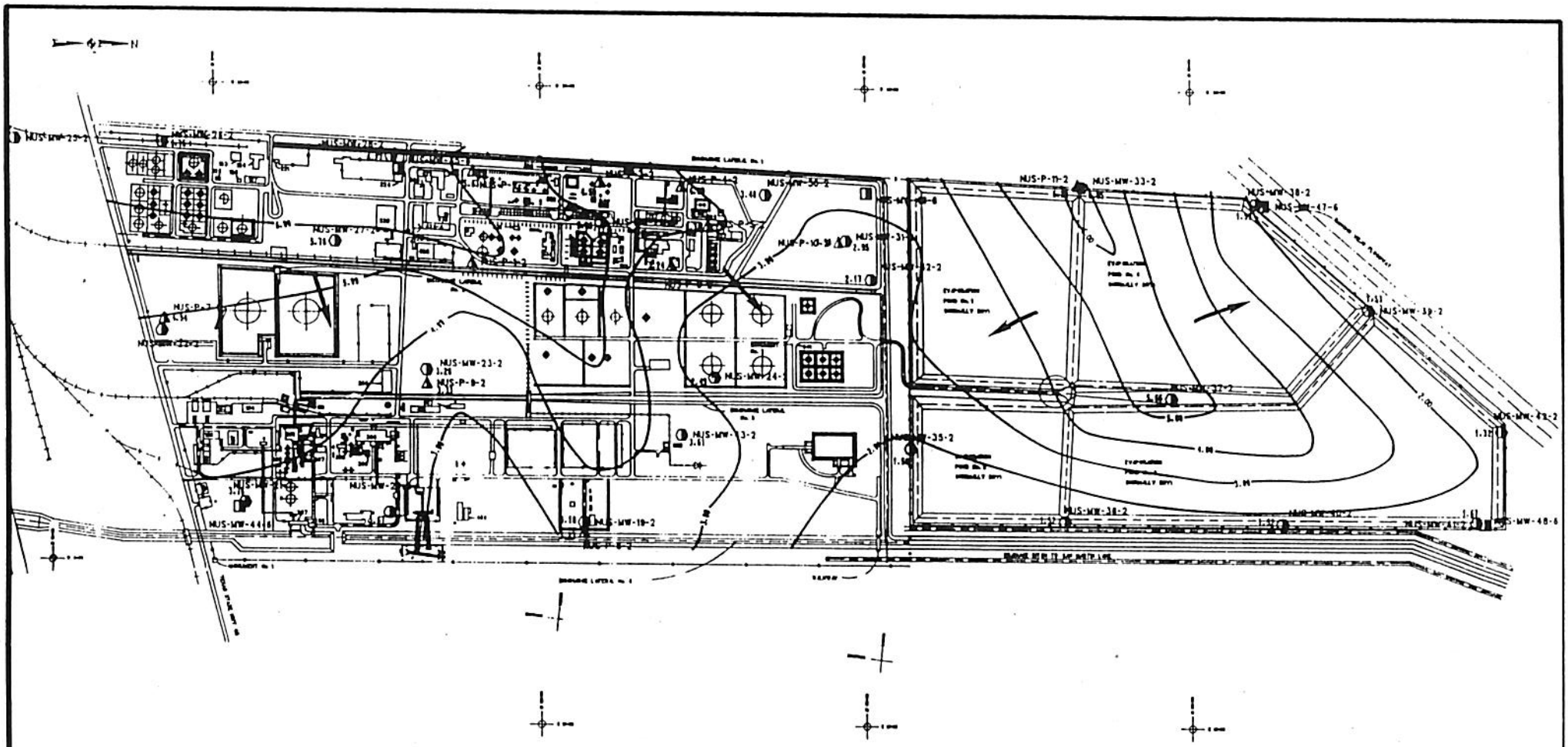
→ Groundwater flow direction

REFERENCE DRAWINGS
710M2001.DGN LEVELS - 1,2
710M2005.DGN LEVELS - 1,3

FIGURE 3 14

REVISED 7-28-91

DRAWN BY M. GREEN	GROUNDWATER ELEVATION CONTOURS FOR WELLS SCREENED IN ZONE 2 MARCH 22, 1991 BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE: 2-12-91			
ENGINEER D. GIBSON			
DATE: 2-12-91			
CAD DWG. NO. 710M2820.DGN	SCALE: 1" = 600'	HNUS DWG. NO. 710M-2827	REV. 0



NOTES:

1. The Union Carbide Brownsville, Texas Plant has not operated since 1983.
2. Drawing excerpted from Union Carbide Drawing Numbers 838520-00 (Revised 1982) and Number 840265-99.
3. Groundwater elevations with respect to Mean Sea Level.
4. Contour Interval is 0.80 feet.

LEGEND:

-0.80- Contour Interval line

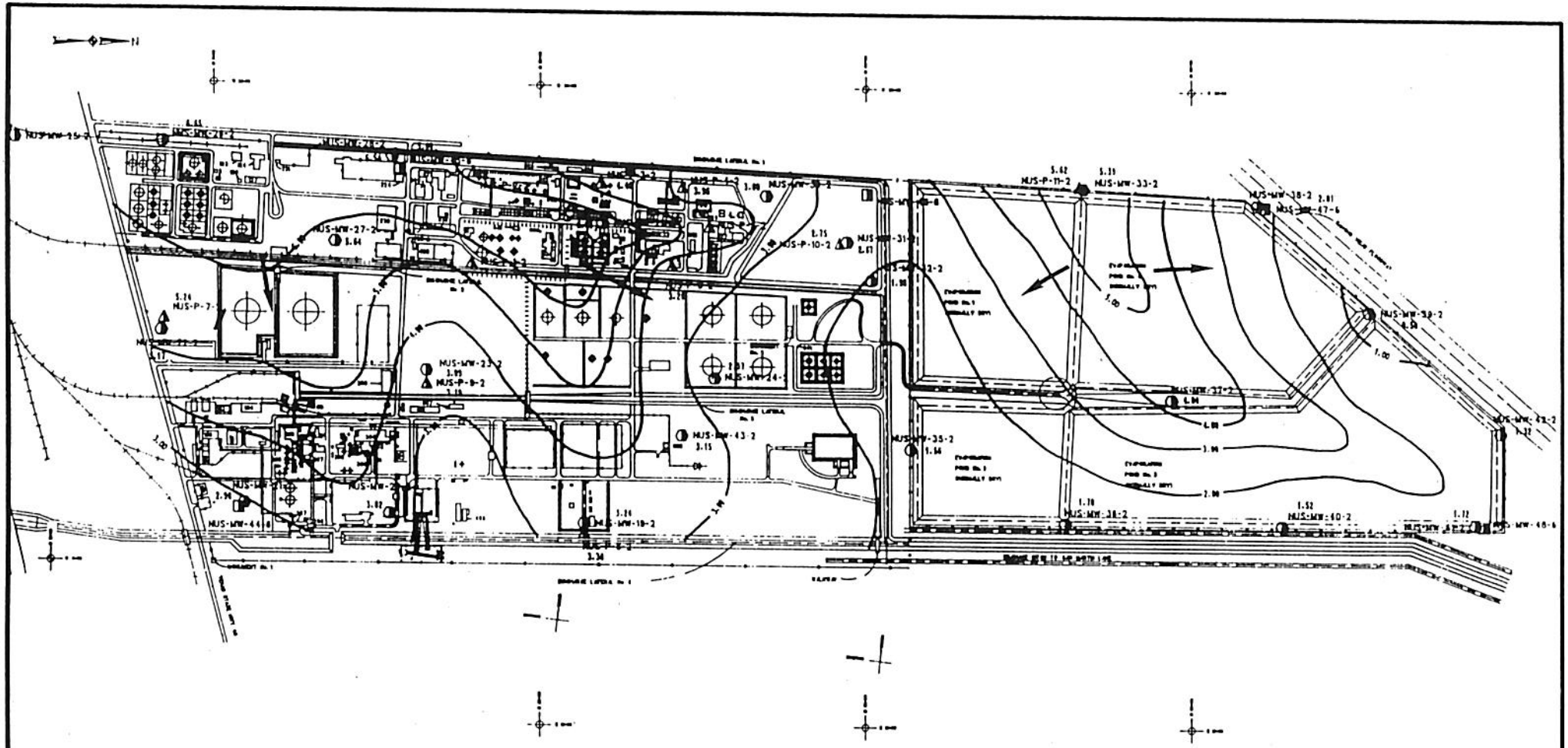
Groundwater flow direction

REFERENCE DRAWINGS
710M2001.DGN LEVELS - 1,2
710M2005.DGN LEVELS - 1,3

FIGURE 3-15

REVISED 7-28-91

DRAWN BY M. GREEN	GROUNDWATER ELEVATION CONTOURS FOR WELLS SCREENED IN ZONE 2 APRIL 29, 1991 UCC&P BROWNSVILLE, TEXAS	HALLIBURTON NUS Environmental Corporation
DATE: 2-12-91		
ENGINEER D. GIBSON		
DATE: 2-12-91		
CAD DWG. NO. 710M2820.DGN	SCALE: 1" = 600' HNUS DWG. NO. 710M-2828 REV. 0	



NOTES:

1. The Union Carbide Brownsville, Texas Plant has not operated since 1983.
2. Drawing excerpted from Union Carbide Drawing Numbers 838920-00 (Revised 1982) and Number 840265-99.
3. Groundwater elevations with respect to Mean Sea Level.
4. Contour Interval is 1.00 foot.

LEGEND:

Contour Interval line

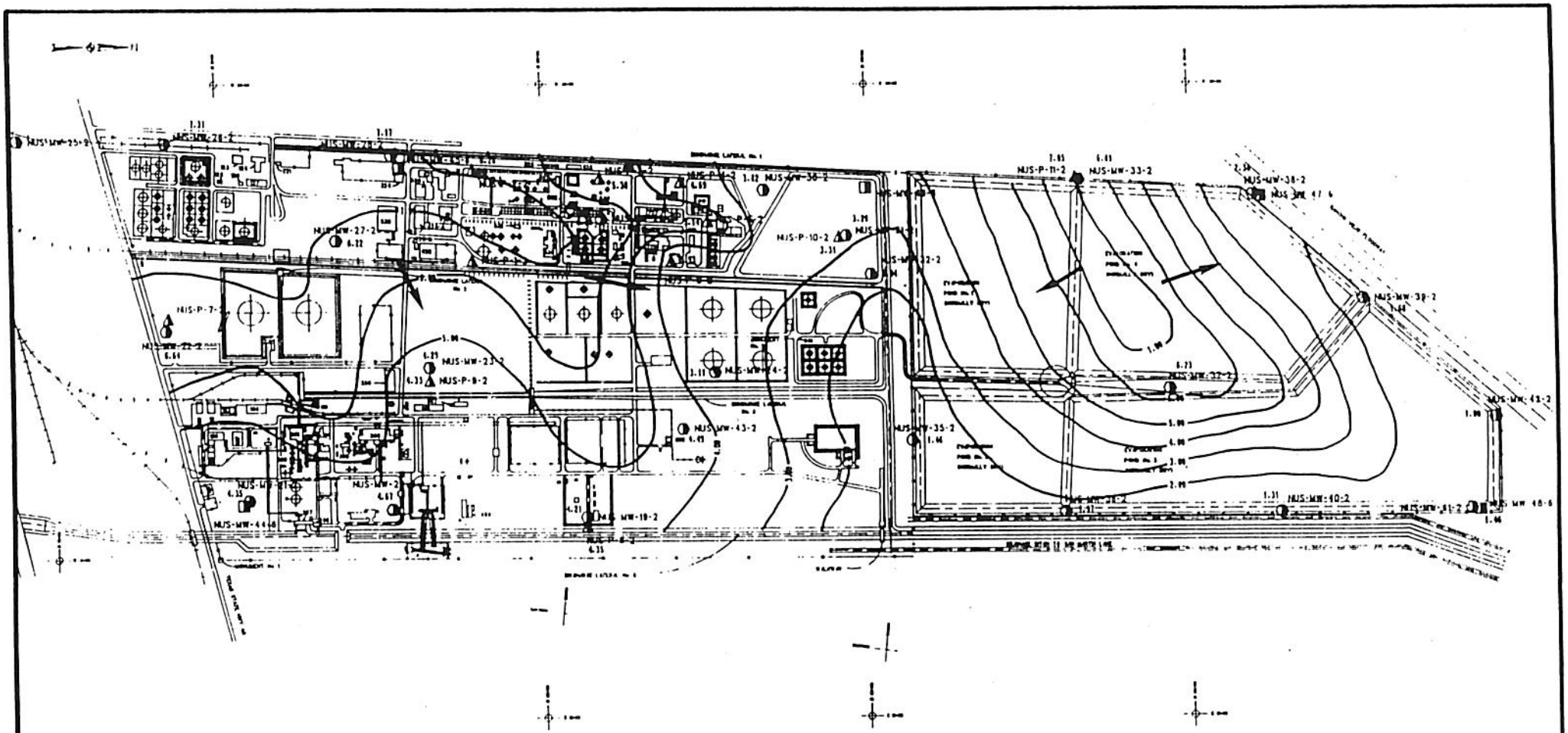
Groundwater flow direction

REFERENCE DRAWINGS
710M2001.DGN LEVELS - 1,2
710M2005.DGN LEVELS - 1,3

FIGURE 3 16

REVISED 7-28-91

DRAWN BY M. GREEN	GROUNDWATER ELEVATION CONTOURS FOR WELLS SCREENED IN ZONE 2 MAY 29, 1991 UCC&P BROWNSVILLE, TEXAS	HALLIBURTON NUS Environmental Corporation
DATE: 2-12-91		
ENGINEER D. GIBSON		
DATE: 2-12-91		
CAD DWG. NO. 710M2820.DGN	SCALE: 1" = 600' HUS DWG. NO. 710M-2835 REV. 0	



NOTES:

1. The Union Carbide Brownsville, Texas Plant has not operated since 1983.
2. Drawing excerpted from Union Carbide Drawing Numbers 838920-00 (Revised 1982) and Number 840265-99.
3. Groundwater elevations with respect to Mean Sea Level.
4. Contour interval is 1.00 foot.

LEGEND:

—6.00— Contour Interval Line

Groundwater flow direction

REFERENCE DRAWINGS
710M2001.DGN LEVELS - 1,2
710M2005.DGN LEVELS - 1,3

FIGUHE 3-17

REVISED 7-28-91

DRAWN BY M. GREEN	GROUNDWATER ELEVATION CONTOURS FOR WELLS SCREENED IN ZONE 2 JUNE 24, 1991 UCC&P BROWNSVILLE, TEXAS		HALLIBURTON NUS Environmental Corporation
DATE: 2-12-91			
ENGINEER D. GIBSON			
DATE: 2-12-91			
CAD DWG NO. 710M2820.DGN	SCALE: 1" = 600'	HNUS DWG NO. 710M-2834	REV. 0